OCTOBER 13, 1952

STEEL

THE WEEKLY MAGAZINE OF METALWORKING

METALS IN THE JETOMIC AGE

—see page 148

METAL SHOW ISSUE

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How KORHUMEL Personalized Warehouse Service

Fits into YOUR Job Schedule Planning

When you plan your job schedules around the dependability of Korhumel warehousing service you can have more efficient production at lower costs. Shifting production schedules, changes in job specifications and emergency requirements can all mean idle machines if the *right* raw materials are not available as needed.

Korhumel's day-to-day ability to fill changing orders eliminates this production headache for you. You save money and cut production costs in these ways too:

- at Korhumel you can select from a wide range of sizes, types and gauges of steel and aluminum to meet any of your raw material needs
- daily delivery eliminates tying up your dollars in idle inventory
- no inventory loss due to design changes requiring different sizes and gauges
- smaller space requirements mean more space for production
- accounting, insurance and handling costs are cut
- complete facilities for precision slitting, shearing and cutting to length save you time and money

A Korhumel Sales Engineer in your territory will be glad to show you how Korhumel Personalized Warehouse Service fits into your production planning picture. Check your classified telephone directory . . . call him today or write us.

STEEL
Cold and Hot Rolled
Strip and Sheet
Spring Steel, Tempered and Annealed
Feeler Gauge
Round Edge Flat Wire
Shim Steel
Electro Galvanized
Electrical Sheets
Tin Plate
Cold Finished Bars
Steel Tubing, Seamless and Welded
Rigidtex Stainless

ALUMINUM
Strip and Sheet
Coils
Straight Lengths
Bars

PHOSPHOR BRONZE
Coils and Flats

SERVICES
Slitting
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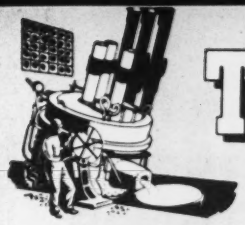


Tool Steel Topics

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

CARBON TOOL STEEL— Toolmakers' First Choice

So many tool steels have been developed for special applications that some people overlook the many uses for carbon tool steels. Actually they're used in larger quantities than any other type of tool steel. An experienced toolmaker usually considers them first, recognizing that they are the logical steels for a starting point.

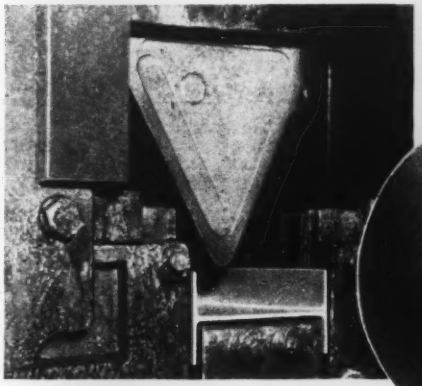
Here's why carbon tool steels are so popular:

- Easiest to machine of all tool steels
- Easy to heat-treat
- High surface hardness reinforced by a tough core
- They develop keen cutting edges

Hand chisels, center punches, and various shock tools are usually made from carbon tool steel having a carbon content of from 0.75 to 0.85 pct. Other ranges of carbon content: 0.90 to 1.00 for cold-heading dies; 1.00 to 1.10 for general-purpose tools and dies (this is the most frequently used analysis); and 1.15 to 1.25 carbon for stone-dressing tools, drawing dies, etc. Our carbon-vanadium steels, containing an addition of 0.15 to 0.25 pct vanadium, have similar applications in many instances.

The controlled hardenability and spheroidized structure of all Bethlehem carbon and carbon-vanadium grades assure uniform response in heat-treatment. Our extensive metallurgical research has established the ideal degree of hardenability for a wide range of applications. Your nearest Bethlehem distributor and our mill depot are at your service when you need top-quality carbon tool steel.

It's easy to machine this chamfering tool holder because all Bethlehem carbon tool steels are carefully spheroidize-annealed to provide a structure that's ideal for easy machining, easy heat-treatment.



The edge of this shear blade chipped because of misalignment which allowed it to strike the bottom blade. Heat checking, caused by unexpected high temperatures, is also to blame for such failures.

After the triangular blade descends and shears a coupon from the web of the steel beam, it moves first to the left and then to the right to shear off the flanges. The lower knife is not visible.

When cold cuts make hot blades

The shear blades usually lasted about one week in a fabricating shop where steel beams and channels were cut in large quantities. Bad spalls on the cutting edges made it necessary to change blades about once a week, and it was taken for granted that little could be done to make them last longer.

One of our metallurgical men learned of this while in the shop on another job. He began to investigate and soon found that the "cold" cutting was generating about 700 F on the blades. This caused the tool steel to develop heat-checks. In addition, the blade was overloaded due to poor alignment which allowed it to strike the bottom blade. The combination of heat and overload explained the poor service life.

The solution: Hot-Work 8, one of our hot-work steels, was tried. It's an 8-pct molybdenum analysis that's tops in wear-resistance when operating temperatures are high. Tempered at 750 F, the first blade made a total of 45,000 cuts. The best previous record was 7,700 cuts.

Here's another instance of how the practical experience of our metallurgical contact men helps to put the finger on tool steel troubles.

BETHLEHEM TOOL STEEL ENGINEER SAYS:

Heat-treat the tool, not the thermocouple

Improper temperatures during heat-treating frequently cause tool failures. In many instances the thermocouple chart shows proper heat-treatment temperatures, but the microstructure of the tool proves that the temperatures recorded were not attained by the tool. This is known as "heat-treating the thermocouple instead of the tool."

Most furnaces show some non-uniformity of temperature — locations near the source of heat are hotter than remote locations and the bottom tends to be colder than the top. A survey of each furnace will reveal the temperature differences which are present. This information makes it possible for the operator to select the location which will indicate most accurately the temperature of tools heated in the furnace; quite often the need for more than one thermocouple is apparent.

A thermocouple indicates the temperature of its tip only, so it's good practice to place the tip of the thermocouple as near to the tools as possible. Locations near the floor, sides, roof, or near the source of heat should be avoided. The thermocouple is an accurate and highly useful device, but it's not foolproof.

Now!

TOCCO* Induction Melting Furnaces for Precision Casting

One of the TOCCO Induction Melting Furnaces used at Arwood Precision Casting Co. Note TOCCO control station in background.

● Engineers at Arwood Precision Casting Co. use TOCCO Induction Melting Furnaces for melting and remelting quality steel. Other companies have found TOCCO equally adaptable for melting non-ferrous metals. No wonder! *Look at the advantages:*

- ★ Stepless power control
- ★ Extremely Rapid Melting
- ★ High Efficiency on Intermittent Operation
- ★ Good Mixing because of Natural Agitation
- ★ Extremely Low Alloy Loss
- ★ No Carbon Pick-up
- ★ No Contamination when Composition of Charges is Changed
- ★ High Reproducibility of Results
- ★ Minimum Space Requirements
- ★ No Special Installation Charge
- ★ Simple, Safe Operation
- ★ Clean, Comfortable Working Conditions

If any of these advantages suggest economies in your operations write for full details—no obligation, of course.

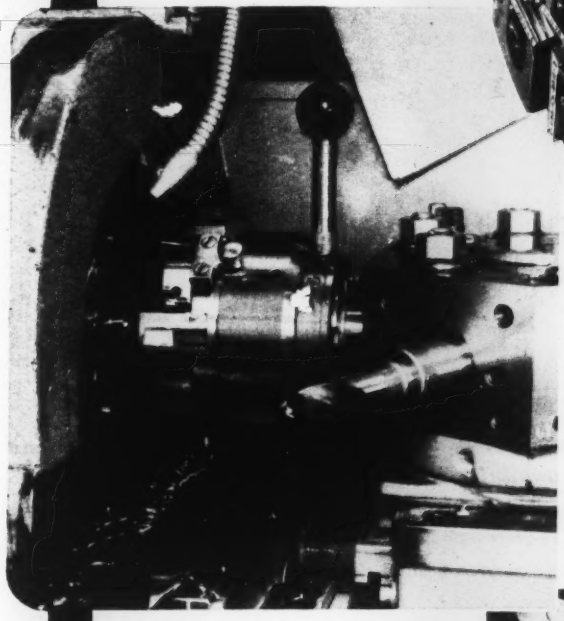
THE OHIO CRANKSHAFT COMPANY • CLEVELAND 1, OHIO

Induction Heating Equipment must meet the requirements of the Federal Communication Commission's Rules and Regulations Relating to Industrial, Scientific and Medical Services, Part 18. All TOCCO equipment is certified to comply with these rules and regulations.

1800 Stainless Steel Threads PER CHASER GRIND

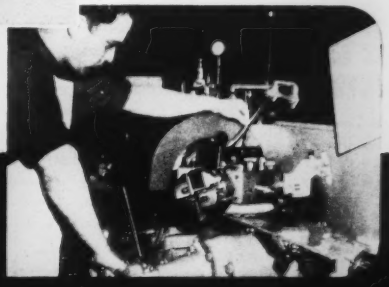
LANDMATIC HEADS are every day saving production dollars for the Crawford Fitting Company of Cleveland by low tool cost and minimum machine downtime.

This company manufactures Swagelok Tube Fittings ranging from ⅛" to 1" in diameter. These fittings are produced from stainless steel tees of austenitic type 316 cold-worked to a Brinell hardness of 250. In producing the 7/16" fitting, for example, (as illustrated) 20-pitch straight UN threads are cut close to the shoulder 5/16" long to Class 3 fit.



LANDMATIC Hardened and Ground Heads, such as used by Crawford, are designed to produce threads to Class 3 or 4 fit in all types of tough materials. Unusually heavy construction and sound fundamental die head design assure the rigidity necessary for accurate threads. The inherent features of the design of the Landis Tangential Chasers and their proper manufacture and hardening, developed during 50 years of threading experience, ensure long chaser life and low threading cost.

If you require threads on stainless steel or other tough material, LANDMATIC Hardened and Ground Heads offer you these same cost-saving features. Please send specifications and write for Bulletin F-80 for additional information.



LANDIS *Machine* CO.

WAYNESBORO · PENNSYLVANIA U. S. A.

COUNT 'EM . . .
JUST COUNT 'EM!

TENNESSEE
PRODUCTS & CHEMICAL
Corporation
NASHVILLE, TENNESSEE

It's as simple as 1 and 1. Tennessee Products' ferrosilicon and ferromanganese briquettes contain exact amounts of these ferro alloys. Just count out the required number for your cupola charge. You eliminate time-consuming weighing, and facilitate rigid product control for a faster, more economical foundry operation.

Ferrosilicon is available in lump, sized and powder form as well. TENNESSEE also makes low phosphorous pig iron and high grade malleable pig iron for the metal industries.

For complete details contact Tennessee Products & Chemical Corp., First American National Bank Building, Nashville 3, Tennessee.

This Week in Metalworking

STEEL

Vol. 131 No. 15 Oct. 13, 1952

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All in One Bulletin

15-POINT COMPARISON CHART

STATEMENTS BY BEARING MANUFACTURERS

CUTAWAY DRAWINGS AND PHOTOS

Call your nearest Reliance Sales Representative or write us direct for your free copy of this fact-filled bulletin on the vital differences in the bearing designs of A-c. motors. Ask for Bulletin B-2201.

RELIANCE Precision Built MOTORS

Sales Representatives in Principal Cities

RELIANCE
ELECTRIC AND ENGINEERING CO.
1081 Ivanhoe Road • Cleveland 10, Ohio

"All Motors are NOT Alike"

If you are a manufacturer of building products

REASON 5 WHY

Pannier

"MASTER MARKER"

SUPREME STAMPING HOLDERS

are preferred

1 REPLACEABLE STAMPING HEAD
Increases holder life; will not mushroom or spall

2 ONE PIECE BODY
High grade bar tool steel; no rivets or welded joints

3 TYPE KEY
Single bar simplifies type insertion; locks type in place

4 HARDENED ANVIL
Prevents wear; assures constant type alignment

5 STEEL TYPE
Famous job proved Pannier "Master Marker" quality

Supreme Holder stamps multiple characters in hot or cold metal with one easy operation. Write for details of styles and sizes available.

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THE PANNIER CORPORATION
220 PANNIER BUILDING
Pittsburgh 12, Pa.

PANNIER

Behind the Scenes...

Bolts from the Blue

Apparently many people have a genuine concern about avoiding lightning. Karl B. McEachron, manager of General Electric Co.'s Laboratory-engineering department is often asked questions about personal protection from this nature's roundhouse punch.

One person was afraid of being struck while riding horseback. He wanted to know if a chain dangled

from his head to the ground would help. He got the idea from watching trucks.

Another asked about the soundness of a lightning rod halo. This consisted of a ring with a spike sticking up from it and was to be worn on the head. The inventor claimed he had good results in reducing static electricity with his device.

Cover Stuff

The cover article for this Metal Show issue is by Dr. Allen Gray, technical editor. He's explored and interpreted contemporary metallurgical research and trends. He's talked about the so-called "glamour metals"—those in today's spotlight. He also discusses some of the recent developments in the old stand-by metals.

This article is one of a group in this issue timed to coincide with the big show in Philadelphia. The editors, by the way, introduce STEEL's description of the age of jet aircraft and atomic energy. It's the "Jetomic Age."

By the way that picture in the automotive research article is not an aerial view of the Mojave Desert. As the caption points out it's a piece of steel at 40,000 magnification on Chrysler's electron microscope.

Mail Mystery

Several weeks ago Howard Tuttle, STEEL's Detroit editor, received two postcards addressed to Steel, Detroit, Mich. The only information on the back of each was a name and address.

He puzzled over this for some hours and finally decided the only answer was to write the people and ask for some explanation.

They replied that they had been listening to a radio program, "I Was A Communist for the FBI", sponsored by McLouth Steel Co. This program mentioned a booklet on 100 facts about Communism and the address should have been Steel, WJR, Detroit 2. The incident was further confused by the fact that STEEL's Detroit office is across the street from radio station WJR. As it ended the people got the pamphlet and Howard got his answer.

Special Issue

This special Metal Show issue has more than 375 total pages. It represents the combined efforts of 32 editors, 10 artists, 19 people in the advertising and scheduling departments and 153 in the press division.

We think all of the articles will be of interest to all readers who have anything to do with the metalworking industry.

High IQ

First in with the right answers to the Shrdlu quiz was Frank A. Schneider Sr. of F. A. Schneider Co. He was also one of the first ones to qualify for the sheepskin in the last quiz. He'll be given the additional B.T.S. degree, cum laude, and will have another diploma to his credit. Code to the correct answers, incidentally is BAABBCBBCBACBAB. Number 14, of course, could be A, B, or C.

Puzzle Corner

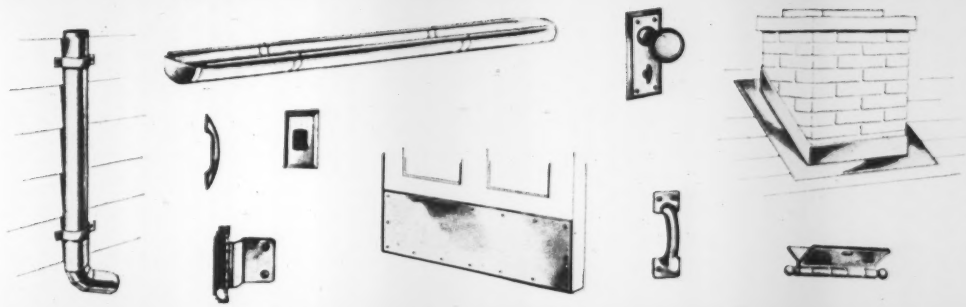
The problem for this week is similar to some we've carried, but it may be a bit more involved. Here it is—see what you can do with it.

When I was born, my sister was one-fourth as old as my mother. She is now one-third as old as my father and my own age is one-fourth of my mother's. In four years, I shall be one-fourth as old as my father. How old am I, my parents and my sister?

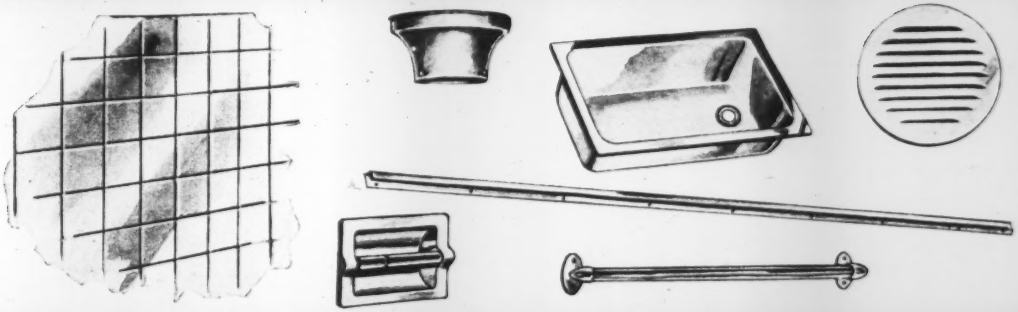
Shrdlu

(Metalworking Outlook—Page 111)

If you are a manufacturer of building products



and are caught in the critical material squeeze



and are looking for a way out . . .

Many manufacturers of building materials find their production seriously threatened by NPA directives limiting or prohibiting production of their products from critical materials. Especially hard hit are manufacturers of building materials normally made of 18-8 stainless, brass, copper, aluminum, or chrome plated.

If your operations fall in any of these categories, then you will want to know more about Sharon '430' Stainless Steel. It is the best available material today for many such applications. Sharon '430' is a straight chromium grade of stainless with a record of successful application.

It is readily available with few restrictions as to end use. It may fit your production setup perfectly. If so, your critical material worries are ended.

Get the facts on this popular stainless today. Contact your nearest Sharon representative or write direct. Engineering data and technical assistance are available without obligation. A new booklet describing how to use Sharon '430' Stainless may be obtained by writing direct to ***Sharon Steel Corporation, Department 81052 Sharon, Pa.***

Those manufacturing gutters, downspouts, flashing, etc., will want a copy of the new information-packed booklet *Sharon '430' for Better Roof Drainage Systems*. Available from district sales offices or by writing direct.

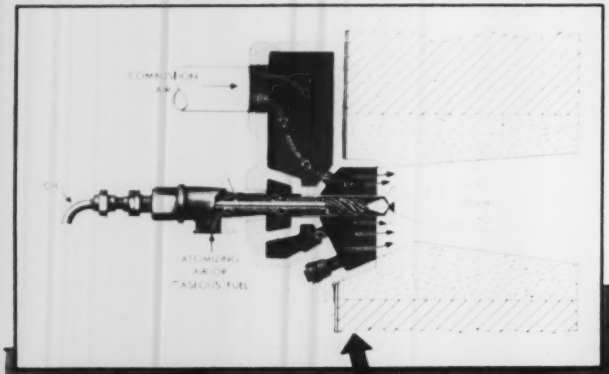
your answer is *Sharon* 430 *stainless steel*

SHARONSTEEL

ANNOUNCING

The BLOOM LP OIL BURNER

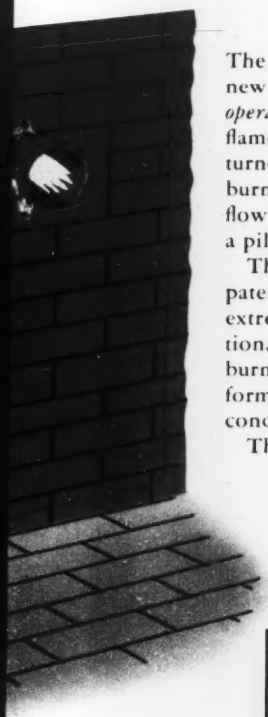
Low-pressure 16-oz. air atomizing



Section through LP Burner and view of typical furnace wall, showing the ideal low-turndown condition obtainable with Bloom LP Burners.

Designed to solve 3 problems:

WIDE RANGE TURNDOWN on oil operation
FLAME STABILITY at extremely low fuel input
ACCURATE BURNER CONTROL without intricate adjustments



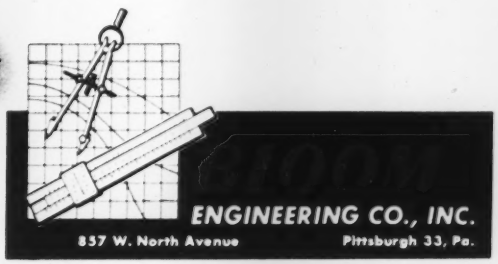
The outstanding feature of the unique new Bloom LP Oil Burner is *dependable operation at extremely low input.* Stable flame conditions are maintained over a turndown range of 10 to 1, and the burner operates satisfactorily with oil flow as low as ½ gal. per hour without a pilot.

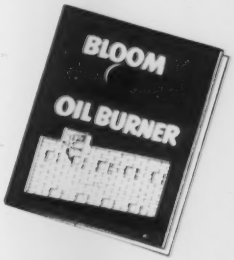
Through the combination of the Bloom patented Flame Retention Nozzle and an extremely efficient method of atomization, (using 16 oz. air pressure), this burner provides highly satisfactory performance over a wide range of heating conditions.

The Bloom LP Oil Burner has no moving parts. No individual burner adjustments need be made to change heating conditions. Control is easily and quickly accomplished through the customary zone control fuel valves.

With the Bloom LP Oil Burner you get:

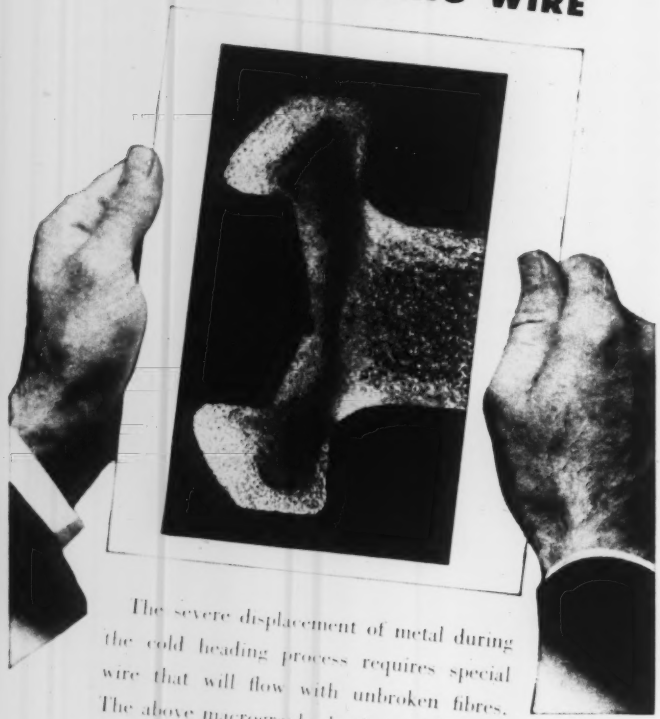
- ★ A wide range of turndown—10 to 1
- ★ Dependable operation at flows as low as ½ gph.
- ★ Complete, accurate control using zone control valves; rather than complicated mechanical linkages for burner adjustment
- ★ Equal distribution of fuel between individual burners without delicate burner adjustments. Maximum flexibility of furnace operation





WRITE for new bulletin describing in greater detail the design and operation of the Bloom LP Oil Burner. Ask for bulletin C-220.

KEYSTONE
"SPECIAL PROCESSED"
COLD HEADING WIRE



The severe displacement of metal during the cold heading process requires special wire that will flow with unbroken fibres. The above macrograph clearly indicates the excellent grain flow in a recessed-head screw made from Keystone "Special Processed" C-1012 Cold Heading Wire.

Keystone's "Special Processed" Cold Heading Wire is available in C-1035 and C-1038 analysis for high strength, heat treated screws and bolts.

INDUSTRIAL WIRE SPECIALISTS

Keystone Steel & Wire Company
PEORIA 7, ILLINOIS

Peep Show for New Cars

We have read STEEL for many years with great interest. Particularly the "Mirrors of Motordom" and "Windows of Washington" columns.

Your Mr. Tuttle seems to know his way around Detroit which, incidentally, is our old home town, too. Most of our executives and salesmen have been driving Chevrolet cars for a number of years and we have some 1953 models on order, but it would help our purchasing and planning if we knew the following:

1. When will the 1953 Chevrolets be released to the public?
2. We understand there will be radical body changes; what do you know about this?
3. Is Chevrolet coming out with a V-8 engine in the 1953 cars as reported?

S. M. Levyn, president
Acme Electric Welding Co.
Los Angeles

● *Release date of the new cars is, of course, one the deepest secrets of the automakers. But, indications are that the Chevrolets will become available in mid-January, 1953. The new Chevrolet body, no description of which is now obtainable, is believed to be completely different. The fact that Chevrolet's V-8 engine does not appear possible of installation in 1953 was mentioned in "Mirrors" (Aug. 18, p. 78) and that statement still stands.—ED.*

Developments in Plastic Dies

We are extremely appreciative of the article appearing in STEEL under the title "Plastic Dies Draw Truck Panels" (Sept. 15, p. 92) and wish to congratulate you on the fine work you have done. This article has created a considerable amount of interest and many letters have been received requesting further information by large concerns throughout the country.

Our Detroit representative has been instructed to keep you advised of new applications of Tool-Plastic as they develop.

L. R. Miller
president & general manager
Rezolin Inc.
Los Angeles

The Battle Has Already Begun

The enclosed (price change announcement to all customers) I think will be of extreme interest to you in your continued attempts at exposing inequities created by government agencies.

The actions of the Office of Price Stabilization, following the recent increases granted basic steel producing companies, and the subsequent increase in price allowed them, has been fraught with inconsistencies and inequities. The fasteners industry, and particularly those of us in this industry who have been forced to follow the steel pattern in

(*Continued on following page*)

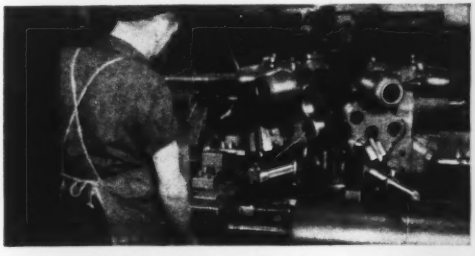
FASTERMATICS
Produce Faster— Pay Off Faster

It may seem incredible, in this day and age, for any major machine tool to "buy" itself in nine short weeks of operation. But that's exactly what the Fastermatic Automatic Turret Lathe did on this job of machining clutch plate hubs.

Former time, on hand-operated turret lathes, was 15 minutes per piece. The Fastermatic, with automatic control of all machine functions, reduced the time to only 3 minutes, floor to floor.

Earnings piled up so fast over former production costs that the Fastermatic paid for itself in just 9 weeks—or 893 hours of operation.

Do you have work that permits a number of cuts in one chucking? Investigate the Fastermatics. You may have a big opportunity to increase production, cut costs and save man power.



In this tooling setup, only 3 turret faces are needed to turn each part. With duplicate tooling on the remaining 3 faces of the hexagon turret, 2 parts are machined with each complete turret cycle. The operator merely loads and unloads the work.

THE GISHOLT ROUND TABLE *represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.*

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

SAVE BOTH WAYS

1 DIRECT PRODUCTION COSTS

2 HANDLING COSTS

Searching out new and better ways of *making* things is a fine idea. It pays. But don't forget to apply the same scrutiny to *handling operations*. That pays also, particularly when you call in a Logan Conveyor engineer.

Virtually every mill and factory "uses conveyors" today, but many of them make only *partial* use of this production aid. So check now, all your operations, for cost-cutting conveyor possibilities. And don't forget, when you specify Logan Conveyors you get those extras in design and engineering that give you the highest percentage of return. Write today for literature.

Logan Conveyors

LOGAN CO., 535 CABEL ST., LOUISVILLE, KY.

LETTERS

Concluded from preceding page

wages, plus raw materials costs, have been unfairly dealt with.

It is my opinion that magazines such as yours should comment on such inequitable situations emanating from bureaucratic government.

T. F. Smith
Oliver Iron & Steel Corp.
Pittsburgh

• *So do we. See "Jokers in Pass-Through Formula" (Sept. 15, p. 63) and "Wage Fumble in the Pass-Through" (Sept. 22, p. 84).—ED.*

Big Interest in Big Plant

May we have 8 copies of the following sections of STEEL for Sept. 22:

Fairless Works—Steel Man's Dream
Build-up in Steel.

Howard A. Knox
Iron & steel division
National Production Authority
Washington

. . . may we have 1000 reprints of the Fairless Works article?

W. Everett McLaine
U. S. Steel Co.
Pittsburgh

. . . send six copies of the Fairless Works article and the "Build-Up in Steel."

Wayne Laughlin
Jones & Laughlin Steel Corp.
Pittsburgh

• *These and many other requests for extra copies and reprints of the "Fairless Works—Steel Man's Dream" are being filled as quickly as possible.—ED.*

Diesel Date Incorrect

In STEEL (Aug. 18, p. 68) you give a figure of 12,452 diesel-electric locomotive units in use Jan. 1, 1952, and 20,519 in use June 1, 1952.

It seems that one of those two figures is wrong. As stated in the article, production during the first six months of 1952 has been 6 times 327, or 1962 units, compared to a difference of over 8000 in the two figures referred to.

I am interested in making use of the corrected figures in a current report. What's the correct answer?

L. G. Rueguor
New York

• *The figures are correct; the date, Jan. 1, 1952, is wrong. It should be Jan. 1, 1950.—ED.*

Who and Where Department

We are anxious to get the street address of Natriphene Co., of Detroit. After reading the article on Industrial Dermatitis Control (Aug. 4, p. 94), we wrote the company in Detroit but our letter was returned for better address.

V. Seeley
Dittmer Gear & Mfg. Corp.
Lockport, N. Y.

• *Address is Natriphene Co., 424 Book Bldg., Detroit.—ED.*

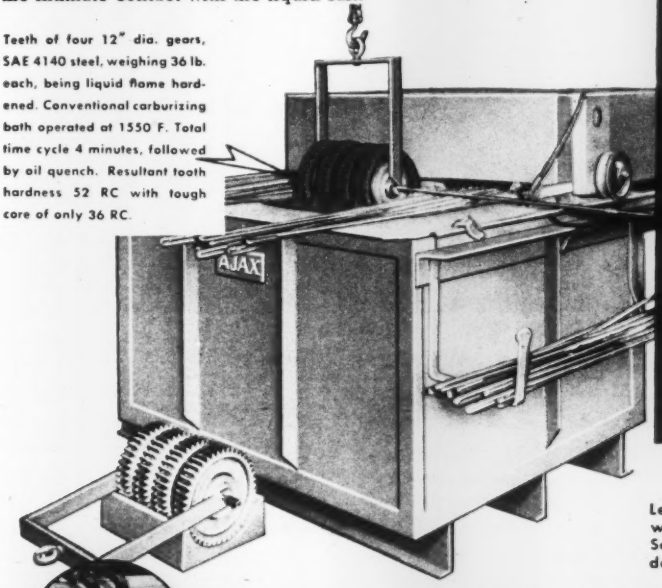
Something NEW in Selective Heat Treating . . .

LIQUID FLAME HEATING

This radically new but commercially proven application of the world renowned Ajax Salt Bath Furnace offers industry many unique advantages over any other method for selectively heating the rim or edges of circular objects, hardening teeth on gears or sprockets, and any other products that require peripheral heating.

The technique of operation is simplicity itself: Either a neutral type salt bath or a carburizing bath, heated by the internal electrode system, is maintained automatically at the required specific temperature. A number of the parts, such as gears, to be selectively heated can be mounted on a shaft within a suitable fixture which is placed over the salt bath. Only that portion of the periphery to be heated (such as the teeth) is immersed in the bath. The work is then rotated and heating is extremely rapid due to conduction by the intimate contact with the liquid salt.

Teeth of four 12" dia. gears, SAE 4140 steel, weighing 36 lb. each, being liquid flame hardened. Conventional carburizing bath operated at 1550 F. Total time cycle 4 minutes, followed by oil quench. Resultant tooth hardness 52 RC with tough core of only 36 RC.



HERE'S PROOF

Let us treat sample batches of your work without obligation in the Ajax Metallurgical Service Laboratory. Better still, come see it done yourself! Reprint No. 73 sent on request.

Associate companies: Ajax Electric Furnace Corp. • Ajax Engineering Corp. • Ajax Electrothermic Corp.

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OVER 4,000 INSTALLATIONS . . . more than all other salt baths combined

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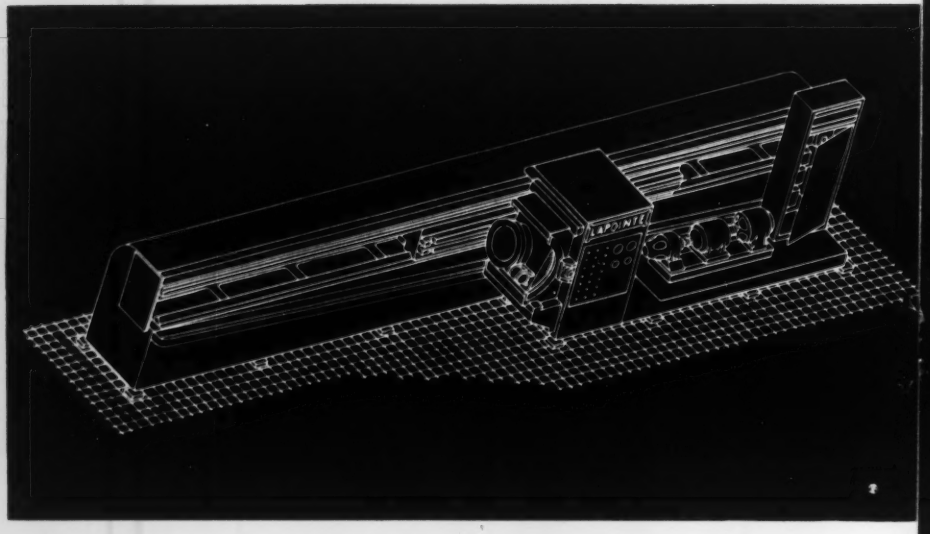
LAPOINTE breaks with tradition . . .

offers tomorrow's BROACHING



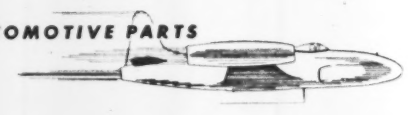
capable of BROACHING SPEEDS in excess of 150 fpm!

Faster than ever before, this DUAL SPEED Lapointe Broaching Machine is available with strokes ranging from 66 inches to 200 inches. All sliding members are lined with natural phenolic plates (another exclusive Lapointe feature) and slide on heat treated meehanite ways. Clamping fixtures operate on hydraulic power.

Rugged, heavy, and rigid, this machine can be equipped with drives up to 200 hp for smooth, powerful high-speed broaching. It embodies the capability, flexibility, simplicity and "guts" that no previously-designed broaching machine ever has had . . . and the maintenance factor is almost negligible.

In short, this machine represents exactly what industry has come to expect from LAPOINTE, the world's pioneer in the art of broaching.

FASTER BROACHING OF JET ENGINE PARTS AND AUTOMOTIVE PARTS



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50 YEARS IN BROACHING!
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This new
LAPOINTE *Electric Drive*

SURFACE BROACHING MACHINE

removes the largest amount of material in the shortest possible time, due to its remarkable broaching speed of 150 fpm — and more!

No longer something to hope for in the future, this new machine has already completely proven itself... several have been in service for some time and are performing production miracles in nationally known plants.

DUAL SPEED gives great flexibility!

An exclusive feature is the **DUAL SPEED** (patent pending), which makes it possible to broach at a certain predetermined speed for any part of the stroke, **and at any other speed for the remainder of the stroke.**

This opportunity to combine roughing and finishing operations in the same stroke indicates the machine's flexibility and is the reason why this newest Lapointe machine is so useful for the broaching of certain jet engine parts and automotive parts.

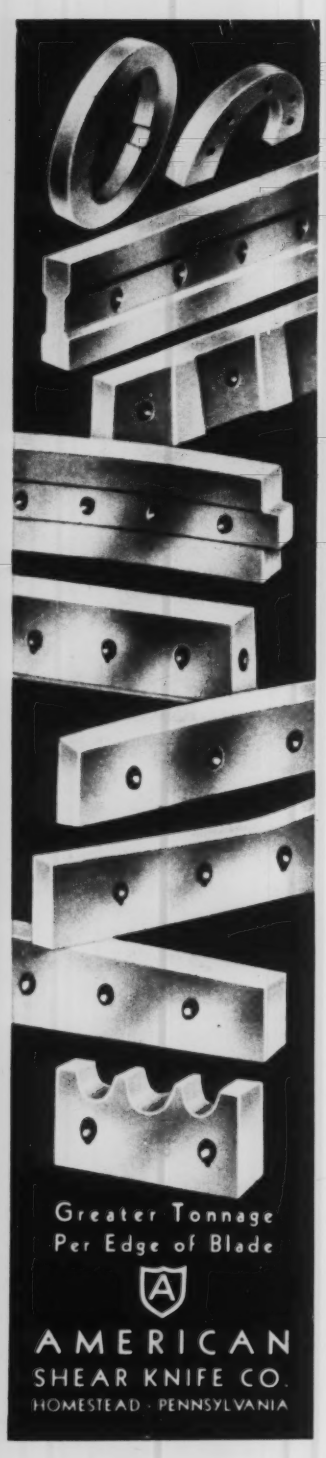
With this outstanding development in broaching — and others to come — it is well to remember now, more than ever, that Lapointe can accept responsibility for the complete job — broaching machines, broaching tools, and fixtures.

Full information about this machine will be given if you ask for literature on the SRHE-3

View of machine during assembly

THE LAPOINTE MACHINE TOOL COMPANY
HUDSON, MASSACHUSETTS • U. S. A.
Branch Factory: Watford, Herts., England

THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF BROACHING MACHINES AND BROACHES



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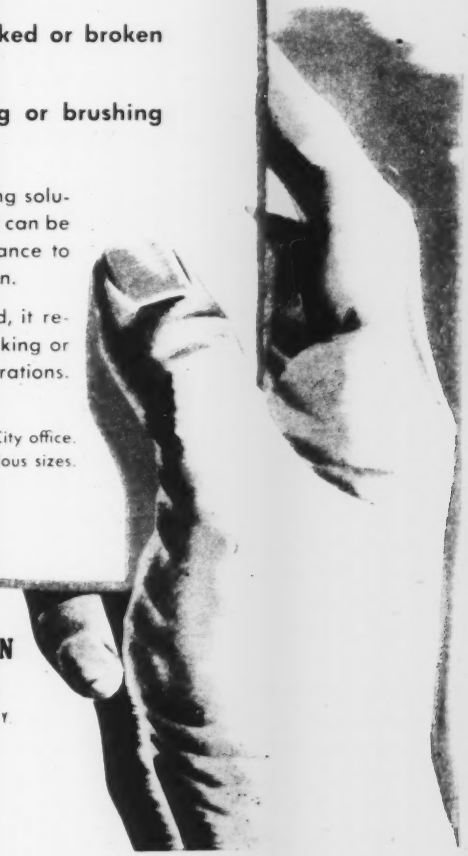

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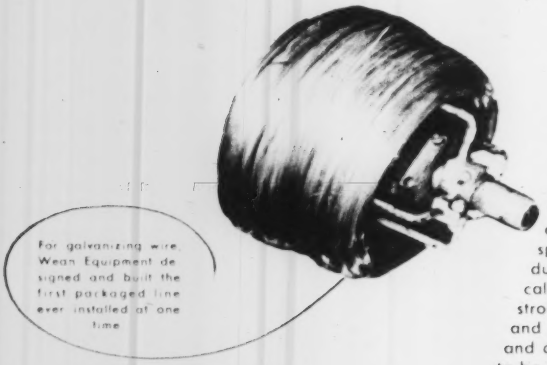
Problem...

DESIGNING AND BUILDING A COMPLETE WIRE GALVANIZING SYSTEM . . .



For galvanizing wire, Wean Equipment designed and built the first packaged line ever installed at one time

Wire machinery in the past always just seemed to accumulate, and be merged into a line that would produce the type and kind of wire desired. Many wire concerns pieced together complete lines, oftentimes fabricating the machinery in their own shops. This is because there was very little coordinated engineering in the field. There was actually no place to go to purchase an entire line from a single source.

Wean Equipment Corporation had established a high reputation for designing and building special machinery for the metals working industries. Complete lines that would automatically perform difficult operations were Wean's strong suit. With this in mind the Colorado Fuel and Iron Corporation asked Wean to design and develop a complete wire galvanizing line to be installed in their Minnequa works.

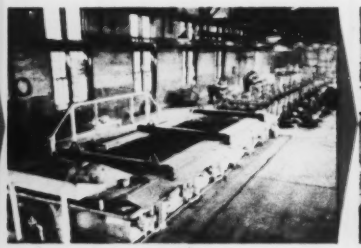
Solution...

PACKAGED LINE THAT PRODUCED BETTER WIRE AT RECORD SPEEDS . . .

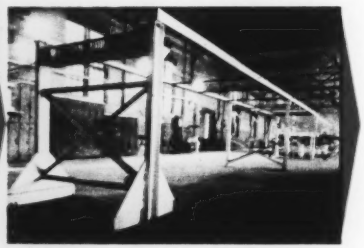
Wean had been experimenting with automatic wire machinery and had assembled perhaps the largest library of wire machinery information held by one company. By drawing on this knowledge it was only a matter of months until the first completely packaged wire galvanizing line was being installed. Today the line is capable of applying a quality coating at a speed of three miles per minute. For all practical purposes there has been no maintenance.

The line is something of a composite of the best features found in studying lines assembled by several leading wire producers. Thirty-six strands of wire are galvanized simultaneously. Each strand has a tandem payoff reel. When one reel has reached the payoff point an operator merely twists the lead of the coil on the second reel to the end of the coil on the first reel and continuous operation is maintained. The wire is acid pickled. It is then water rinsed

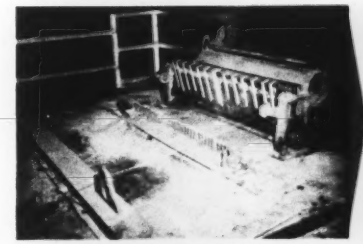
1. **Plain wire** leaves **payoff reels**. Note the two reels for each strand of wire. It immediately enters the



2. **Lead annealing box** where drawing compounds are burned off. It then goes onto a

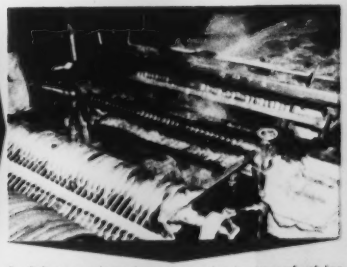


3. **Cooling rack** where wire is air cooled, and into a

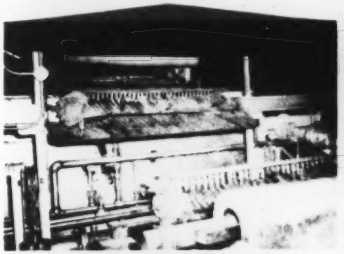


7. **Splice caller,** a unique device that detects the temporary splice, warning operator, then into the . . .

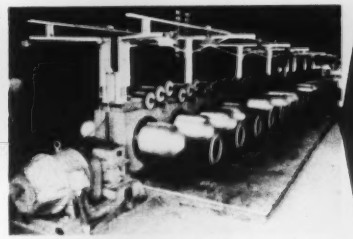
8. **Galvanizing furnace** where zinc coating is applied. The wire then goes through an . . .



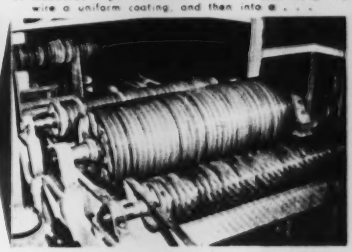
9. **Asbestos wipe** where excess zinc is removed, giving wire a uniform coating, and then into a . . .



6. **Flux tank** where flux is applied preventing oxidation prior to galvanizing, then through the . . .

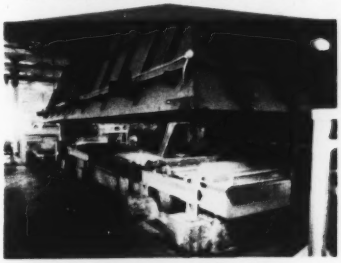


11. **Take-up blocks** where it is coiled and periodically removed.



10. **Cold water quench** for cooling prior to handling, and finally onto . . .

5. **Acid pickle** to clean off remaining scale. It then goes through a second water rinse before entering . . .



4. **Water rinse** for complete cooling. Wire then enters . . .

★ and sent through a zinc bath where it becomes coated. It then runs through an asbestos wipe where excess zinc is removed. At this point a warning system lets the operator know when the rough union (where the coils were attached) is about to come through the wipe. The operator merely lifts the wipe allowing the joint to pass, drops the wipe and the wire continues over a drying rack, and finally onto the take-up spindles.

The take-up spindles are constructed in a manner that perfectly recoils the wire at high speeds, but still allows a collector to unfasten the rough joint and take each original coil off separately.

It's this kind of problem-solving work that has given Wean Equipment Corporation a reputation as the nation's foremost designers and builders of special machinery. Next time you find yourself in need of answers—call in a Wean engineer. There's absolutely no obligation.

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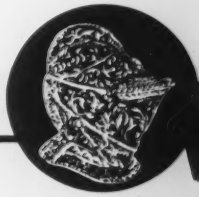

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Wean

Cleveland, Ohio

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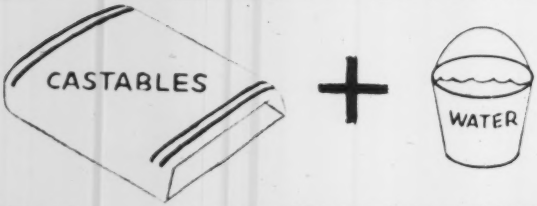

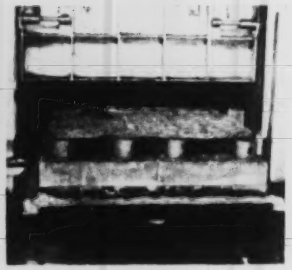

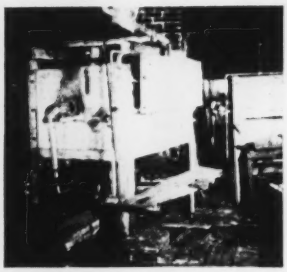

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This convenient way of making Refractory Concrete speeds work and cuts labor costs. It simplifies tough jobs, and some Castables are suitable for use at temperatures of 3000 F. or higher.

REFRACTORY CONCRETE made with Castables is the *adaptable* refractory. Easy to place in any size or shape.

No cutting or fitting necessary when you pour furnace walls, door linings and special shapes. There's no volume change to bother about. Build heat resistant floors, furnace walls, arches and hearths—Refractory Concrete withstands severe thermal shock, resists spalling.

In fact, you'll find Castables tailor-made for speed and convenience on many Refractory Concrete jobs. Handy for repairs, too.

CASTABLES to meet specific temperature and *insulation* requirements are made by manufacturers of refractories and sold by their distributors. For further information, write to LUMNITE DIVISION, Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, N. Y.

*"LUMNITE" is the registered trade mark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company.

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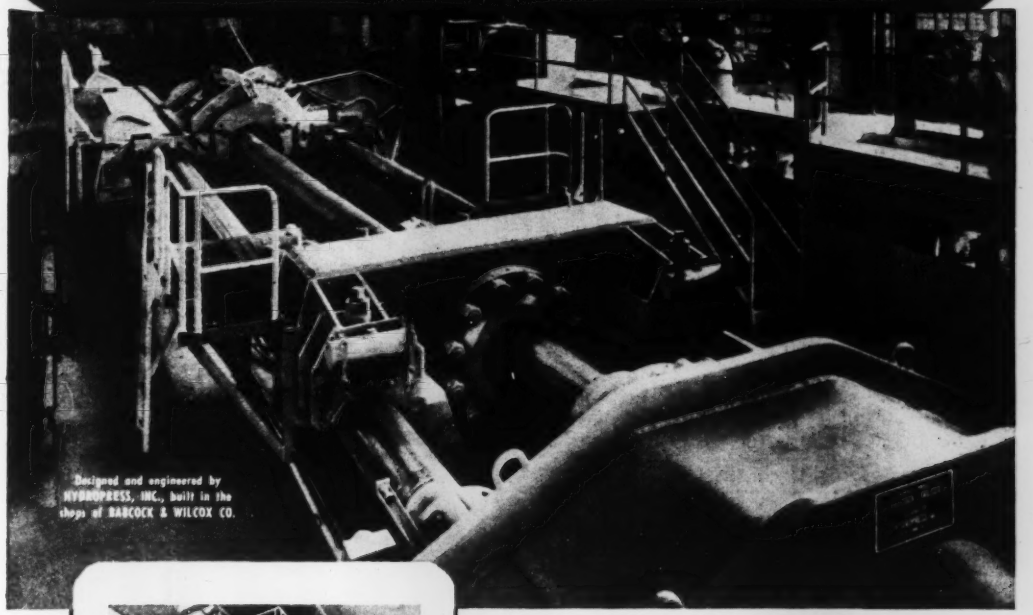
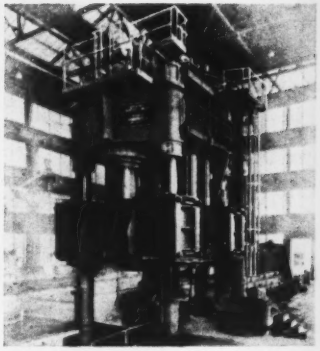


Horizontal Hydraulic Push Bench — largest in America for this purpose — for drawing Alloy and Carbon Steel Ingots or Billets of varying cross sections into seamless tubes and high pressure vessels from a minimum of 8" I.D. up to max. 26" I.D., 4½" Wall Thickness and 22 feet length — at BABCOCK & WILCOX, Barberton, Ohio.



A HYDROPRESS, INC. designed and engineered also "The Nation's Largest Press for Forming Boiler Drum Plate", a 6,500 Ton Hydraulic Piercing and Bending Press; a multi-purpose press for forming the heaviest Steel Plate ever rolled—up to max. 42 feet length and 6" wall thickness — into Boiler Drum Sections.

● ***The products made from thick-walled hollow forgings on that installation are sections for steam lines and boiler headers; there are however other uses in the chemical and processing industries, in the petroleum industry and in many others.***

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	Company reporting	Lighter Weight	Self Loading	Sales Appeal	Resistance to Shock Loads	Fewer Gears Needed	Longer Life (Less Maint.)	Higher Safety Factor	Smoother Operation	Less Space Needed	Greater Load Capacity	Lower Cost	
W	✓						✓	✓	✓	✓			AIRCRAFT
L	✓				✓		✓		✓	✓			
B						✓		✓		✓	✓		AGRICULTURAL EQUIPMENT
E				✓		✓				✓	✓		
P	✓					✓			✓	✓	✓		Bakery Equipment
S				✓		✓			✓	✓			CHEMICAL EQUIPMENT
A					✓	✓		✓	✓	✓	✓		
I							✓		✓		✓		
X						✓		✓		✓			
H							✓		✓	✓	✓		Construction
L				✓					✓	✓	✓		CONVEYORS
H						✓			✓	✓	✓		
J						✓			✓	✓	✓		
L		✓		✓					✓	✓			CRANES HOISTS WINCHES
R						✓			✓	✓			
S	✓								✓	✓	✓		
M						✓	✓		✓	✓	✓		
G						✓	✓			✓	✓		Dams
S									✓	✓			FOOD PROCESSING
V				✓		✓	✓		✓	✓	✓		
M				✓		✓				✓	✓		FOUNDRY EQUIPMENT
W						✓			✓	✓	✓		
A				✓			✓				✓		Laundry
V				✓		✓	✓		✓	✓	✓		Leather
S						✓	✓		✓	✓			Lumber Machinery

Engineers don't buy gears from us because they like the way we part our hair. They check the facts, make up their own minds.

Some of them, we are beginning to believe, know even more about the advantages of Cone-Drive gears and reducers than we do.

As part of a field study, we asked a number of them why they adopted Cone-Drives. The tables show what they told us.

We were not surprised at the frequency with which 'lower cost,' 'space saving' and 'more capacity' showed up. After all, in standard Cone-Drives you automatically get more load capacity in a smaller, lower cost 'package'. But some of the other reasons checked by users are quite thought provoking.

Worth looking into? We'll be glad to send you any technical data we have. Just drop us a line.

And now...

ANOTHER Cone-Drive ADVANTAGE!

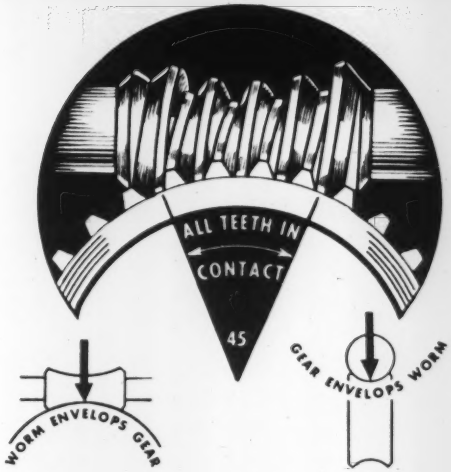
Replacements from stock on all standard gear sets, mountings and reducers if you should ever need them.

Literature Available

ask for

For Executives	"Why Cone-Drive"
Standard Gear sets	#700
Standard Reducers	#8901-50
Standard Couplings	CDC-52
Cone-Drive in Machine Tools	#632
Cone-Drive in Materials Handling	742
6 Ways to Cut Costs	789-50
Applications Reference Sheet	by type of application

Standard CONE-DRIVE GEARS



Cone-Drive gears and reducers derive their advantages primarily from the fact that the gears and worms are double-enveloping. This means greater contact per tooth, more teeth in contact, better load distribution, increased capacity, longer life, lighter weight, smoother operation, higher safety factor, ability to resist shock loads, freedom from service trouble—and *lower overall cost.*

Company reporting	Lighter Weight	Self Locking	Sales Appeal	Resistance to Shock Loads	Fewer Gears Needed	Longer Life (Less Maint.)	Higher Safety Factor	Smoother Operation	Less Space Needed	Greater Load Capacity	Lower Cost	
M			✓		✓	✓		✓	✓	✓	✓	MACHINE TOOLS
C			✓	✓	✓	✓	✓	✓	✓	✓	✓	
O	✓					✓		✓	✓	✓		
J						✓			✓	✓	✓	MATERIALS HANDLING
S			✓						✓	✓	✓	
M							✓	✓	✓	✓	✓	
B					✓		✓		✓	✓	✓	
R				✓		✓	✓		✓	✓	✓	MINING EQUIPMENT
J				✓		✓			✓	✓	✓	
X					✓	✓	✓		✓	✓	✓	
Y			✓			✓	✓		✓	✓	✓	
L						✓		✓	✓		✓	MIXERS & AGITATORS
I	✓				✓		✓		✓	✓	✓	
B					✓	✓		✓	✓		✓	
J						✓		✓			✓	
I							✓		✓		✓	Paper Machinery
D						✓	✓		✓	✓		Plastics
B								✓	✓	✓	✓	RUBBER MACHINERY
A						✓	✓		✓	✓	✓	
B					✓				✓	✓	✓	STEEL INDUSTRY
W					✓			✓	✓		✓	
X						✓		✓	✓	✓	✓	
W						✓				✓	✓	TEXTILES
F					✓			✓	✓		✓	
P			✓				✓	✓	✓	✓	✓	Welding Equip

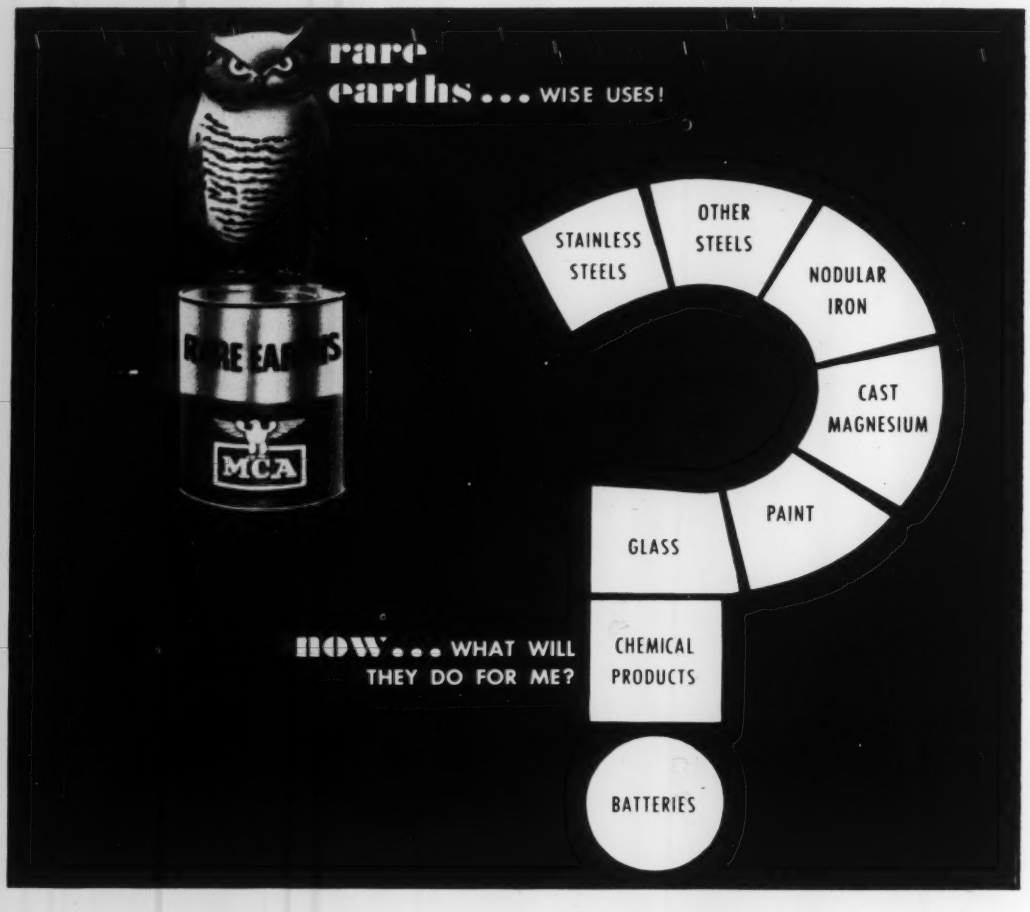
Trade Mark CONE DRIVE GEARS

CONE-DRIVE GEARS

Division Michigan Tool Company

DOUBLE ENVELOPING GEAR SETS & SPEED REDUCERS

7171 E. McNichols Road • Detroit 12, Michigan



New abundance of raw materials obtainable within the United States, newly developed methods of refinement, new knowledge of the properties of Rare Earth substances, new uses tested and definitely proved by the Molybdenum Corporation:

. . . surely you will be interested in applying to your production the benefits of such discoveries. Ample test-records and other data are available, and are at the service of all who can put them to good use.

The Molybdenum Corporation invites and solicits your inquiry.

AMERICAN Production, American Distribution, American Control, Completely Integrated

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Sales Representatives: American Steel and Supply Co., Chicago; Edgar L. Fink, Detroit; Brumley-Donaldson Co., Los Angeles, San Francisco

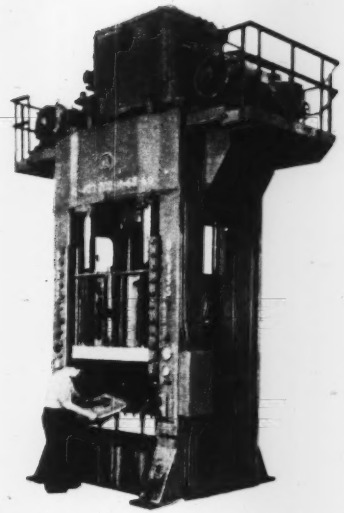
Subsidiaries: Cleveland-Tungsten, Inc., Cleveland, O.; General Tungsten Manufacturing Co., Inc., Union City, N. J.

Works: Washington, Pa.; York, Pa.

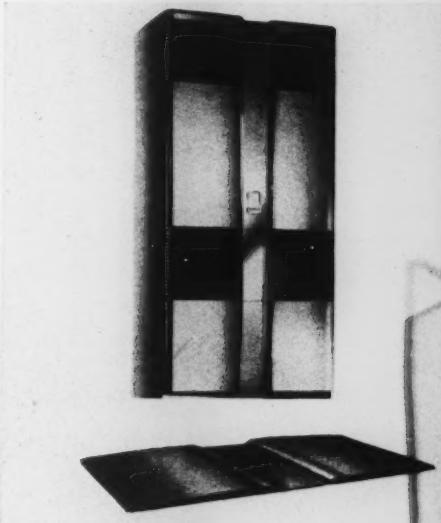
MOLYBDENUM CORPORATION OF AMERICA
Grant Building Pittsburgh, Pa.

MCA

The trend is to more stampings WITH BLISS PRESSES...



1200 14-gauge drip pans are drawn and formed daily in this Bliss press which has a 400-ton blankholder pressure and 200-ton plunger capacity.



Hard-to-make contours in this center-section stamping for a Weathermaker are drawn from 20-gauge steel at the rate of 1300 daily.

Versatile Bliss Hydro-Dynamic Allows Unusual Metal Design

A new 600-ton Bliss double-action Hydro-Dynamic press helps Carrier Corporation produce nice-to-look-at but tough-to-make contours for its line of air conditioners.

Carrier's Vice President of Manufacturing reported that, "By varying ram, blankholder and cushion pressures and the draw cycle, we have been able to complete difficult drawing operations with sharp corners and small radii at the bottom... Actually, the press has exceeded our expectations."

Top performance? Of course—but it's all a matter of picking the proper press. It's what Bliss engineers mean by "the *right* press for the job."

Top panel for window-model Room Air Conditioner has intricate contours, sharp corners and bottom radii. Yet Carrier was able to produce them at the rate of 1200 per eight-hour shift.

E. W. BLISS COMPANY, CANTON, OHIO

E. W. Bliss (England) Ltd., Derby, England

E. W. Bliss Company (Paris), St. Ouen sur Seine, France

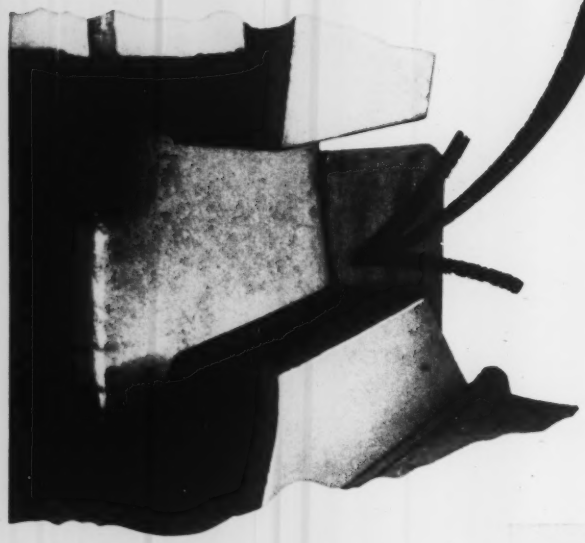
PRESSES, ROLLING MILLS, SPECIAL MACHINERY

Branch offices in Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Philadelphia, Rochester, Toledo, and Toronto, Canada. **West Coast Representatives:** Moore Machinery Co., Los Angeles and San Francisco; Star Machinery Co., Seattle. **Other dealers** in United States cities and throughout the world.

BLISS ON YOUR PRESS IS MORE THAN A NAME ...IT'S A GUARANTEE!

FOUR TIMES THE LIFE...

AND THESE HARD-FACED DIES ARE STILL GOOD



Flat dies formerly used in this blacksmith hammer had to be replaced every three months. Now the dies are protected with a ⅛-in. deposit of HASTELLOY alloy C. The ones shown here have already been in service for over a year, and are expected to last for six to eight months more.

Because the hammers are used almost constantly in a busy steel mill, unprotected dies wore to about ½-in. concavity in just three months' time. Then they had to be scrapped and replaced. When the dies that are hard-faced with HASTELLOY alloy C finally do wear, they can be machined and faced again.

HASTELLOY alloy C has been applied with outstanding success to many other hot-working parts. The alloy rod flows easily. No preheating or peening is necessary. Deposits can be machined with conventional die-sinking tools.

For information on how to apply HASTELLOY alloy C to hot-working parts, write for a copy of "HAYNES Hard-Facing Manual." For on-the-job help, write or phone our nearest District Office.

These hard-faced flat dies have already outlasted four unprotected ones. They are expected to outlast two to three more parts before requiring additional facing.

HAYNES alloys

TRADE MARK

"Haynes" and "Hastelloy" are trade marks of Union Carbide and Carbon Corporation.

Haynes Stellite Company
A Division of
Union Carbide and Carbon Corporation
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BUILDING A GREATER AMERICA

Safety's a big job, too, at Sun Ship. Safety glasses help protect workers who make the chips fly on other big jobs.

. . . BIG JOBS

It would take a super-Pollyanna to describe a machine shop as a sculptor's studio . . . And we haven't yet met a Sun Ship machinist who poses as a Michelangelo . . . at least in his shop work.

But the sculptor fashioning marble into the statue or architectural ornament that will be a thing of beauty . . . and the machinist shaping steel into the 100-foot fractionating tower or small safety valve that will be a thing of service . . . share alike in the knowledge that little chips are part of a big job.

A lot of chips tumble onto the floors of Sun Ship's many shops and shipways every day. It's been that way for more than 35 years. And it's that way because Sun Ship is doing a pretty big job with men and metals as its part in helping build a greater America.

Sun

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SINCE 1916

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IN VAPOR DEGREASING

WHEN SO MUCH

DEPENDS ON A QUALITY SOLVENT

IT PAYS TO SPECIFY

SPEEDY, DEPENDABLE...

"TRICLENE" D Trichlorethylene is the result of over 20 years of research and practical experience in the degreasing field. Made under carefully controlled conditions by the pioneer manufacturer of degreasing solvents in the U. S., each shipment of "Triclene" D is carefully pretested for stability and purity... must meet test standards higher than those established by military and federal specifications (MIL-7003 and O-T-634). Yet "Triclene" D costs no more than other leading brands of degreasing solvents.

"Triclene" D is available nationally in 55 gallon drums and tank cars of various sizes. Distribution points in over 100 principal cities are ready to serve you with prompt deliveries. And trained Du Pont technical representatives with broad experience in the field will be happy to work closely with you in keeping your degreasing installations operating at peak efficiency.

E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Dept., Wilmington 98, Delaware.

Send for your copy of "Vapor Degreasing with Du Pont Non-Flammable Solvents." It shows you how and where "Triclene" D can be used to save time and cut costs in metal cleaning.

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Dept., Wilmington 98, Delaware

Please send me detailed information on Vapor Degreasing: applications, advantages, equipment used . . . and more facts on Du Pont "Triclene" D. We are interested in cleaning____products.

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City_____ State_____

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BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

"Standards or

STEEL

Specials...

MAKE MINE MORSE

Whether it's a run-of-the-mill production job ... or a cranky piece of work in non-ferrous or plastics ... production men *who know the score,* know that Morse Drills score highest on *any* job ... both in clean-cut, accurate work, and in number of holes per grind.

Then, of course, if you're shooting for *extra* high score, tell your Morse-Franchised Distributor to give you Morse *ELECTROLIZED.*

It's good business to keep in touch with your Morse-Franchised Distributor as a matter of course. He has the complete stock, the seasoned know-how, and the established capacity for service that makes him *your standby* on any problem involving drills—and any other cutting tool in the complete Morse Line.

MORSE TWIST DRILL & MACHINE COMPANY
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Warehouses in New York, Chicago, Detroit, Houston, San Francisco

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Cutting Tools

...buy them by phone from your Morse-Franchised Distributor and save ordering time

Now . . . 2 New

AO COVERGLAS GOGGLES

Fit Over Safety
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NEW
Safety
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#326

#327

NEW — 4 WAYS!

1. New Cup Size and Shape
2. New Lens Size and Shape
3. New Side Shields
4. New Easy Lens Replacement

AO's newest development in eye protection—Chippers' and Welders' Coverglas Goggles—can be worn over practically every pair of personal glasses (even the biggest frames) and most types of safety prescription goggles *with and without side shield.*

Wider vision, too, because the lenses are larger and scientifically designed to give up to 20% more vision. Yet, with all these features the goggles weigh but a fraction of an ounce more than ordinary Coverglas goggles . . . cost only slightly more.

These goggles are the newest . . . and two of the greatest . . . developments since the advent of safety goggles. Get all the facts about these two outstanding Coverglas goggles from your AO Safety Products Representative. He can supply you.

QUICK FACTS

- Lens easily replaceable from rear (not front) by means of a spring clamp—no tools needed
- Lightweight, brown plastic cups fit face snugly, won't conduct heat or electricity
- Light-tight side shields for welders (on No. 327 goggle) provide indirect ventilation
- Bridge—High-grade leather. Instant adjustment
- AO worker-lab tests show much greater field of vision and increased comfort
- All-rubber headband, easily adjustable

"326" Chippers' Coverglas goggle supplied with regular Super Armorplate lenses. "327" Welders' Coverglas goggle supplied with regular Noviweld lenses and cover lenses.

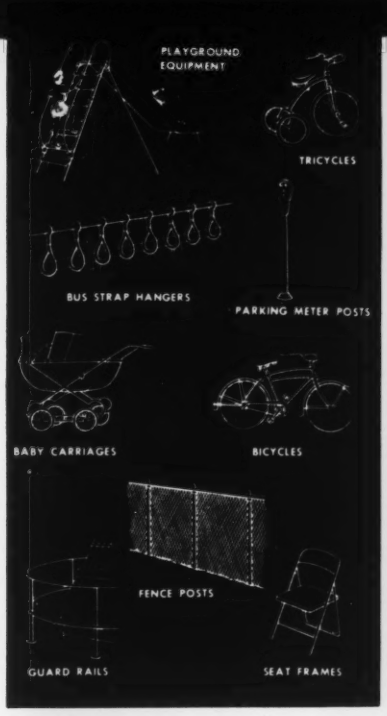
AO's Industrial Vision Program Increases Production, Decreases Accidents. Write today for booklet "Improved Industrial Vision" to 1011 Vision Park, Southbridge, Mass.

American Optical
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

You can't beat a tube

FOR STRENGTH WITHOUT WEIGHT



● In proportion to size and weight, a tube is the *strongest structural form you can buy*. That's why you find so much tubing where light weight with strength is important: in furniture and seat frames, bicycles, playground equipment, fence posts, guard rails and hundreds of other everyday items.

Look at these other features: Tubing is *stiff*, has high resistance to torsional and bending stresses. It's easy to transport, fabricate, and erect. Surface area is small, economical to apply paint and other finishes. In *permanent* installations, the light weight of tubing often permits lighter, cheaper and more easily erected substructures.

If you want tubing that has that unbeatable combination of quality and economy, specify NATIONAL Electric Welded Mechanical Steel Tubing. This low-cost commercial quality tubing is available in sizes up to and including 4" OD. It's easy to bend. Easy to form. Easy to weld. The high quality will keep production men and customers happy. And the low cost . . . that'll keep *you* happy!

For information, write to National Tube Division, United States Steel Company, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

NATIONAL TUBE DIVISION, UNITED STATES STEEL COMPANY, PITTSBURGH, PA.
(Tubing Specialties Division)
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

NATIONAL *Electric Welded* MECHANICAL STEEL TUBING

UNITED STATES STEEL

LIGHT, VERSATILE, RUGGED DELTA TOOLS lead new trend in Metalworking

There's a basic change going on in the metalworking industry — a wholesome, profitable change, with the pace increasing daily — as alert shop men discover that on many operations light, rugged, versatile Delta power tools can out-perform and out-produce heavier, costlier installations.

These five potent facts go far toward explaining the economic common sense of this change:

DELTA TOOLS ARE ACCURATE — their accuracy is built in, makes close precision tolerances easy to achieve.

DELTA TOOLS ARE ADAPTABLE — unusually mobile and portable, they can be tooled for a given job, kept in the tool crib, then moved into and out of production lines with no lost time for setting up, can be used for continuous high-production runs of single or multiple operations.

DELTA TOOLS ARE DURABLE — rugged to withstand hard usage . . . precision built and beautifully balanced, they perform most efficiently throughout long, useful lives.

DELTA TOOLS ARE ECONOMICAL—first cost is moderate; and is quickly amortized by low power cost, low maintenance expense, increased output and elimination of bottlenecks and slower methods.

Dollar for dollar, Delta tools deliver more. Here are 5 reasons why:

1. Lubricated-for-life ball bearings eliminate lubrication problems.
2. Precision bored bearing seats assure accuracy and smooth operation.
3. Preloaded bearings provide maximum rigidity and accuracy under load.
4. All spindles, arbors and collars are precision ground for accuracy.
5. Dynamic balance of rotating parts insures smooth, true performance.

DRILL PRESSES

With Delta Drill Presses, you can work out any set-up to suit your own need — using one spindle or as many as your job requires. Any set-up you want is not merely possible, but is actually very easy — because Delta drill presses have the flexibility to make them fit readily into any multiple spindle set-up. Low in cost, easy to maintain, readily portable, the Delta Drill Press is a good example of fine engineering, rugged construction and compact design.

A 14" DRILL PRESS

Available with either No. 1 Morse taper spindle or Jacobs chuck that takes straight shank drills from No. 60 to full $\frac{1}{2}$-inch. In high- or slow-speed models. Capacities up to $\frac{1}{2}$-inch in cast iron, $\frac{3}{8}$-inch in steel. Quill has 4-inch stroke. Spindles are readily interchangeable — a simple matter to select the right spindle for any job.

B 17" DRILL PRESS

Available with either No. 2 Morse taper spindle or $\frac{1}{2}$-inch Jacobs chuck. In high- or slow-speed models. Capacities up to $\frac{1}{4}$-inch in cast iron. Quill has 5-inch stroke.

METAL CUTTING

C CUT-OFF MACHINE

Cut steel, aluminum, copper, brass in one fast, easy motion with a Delta Cut-Off Machine. It's easily changed from a non-ferrous to a ferrous cut-off machine by switching from steel blade to abrasive wheel.

D 14" METAL CUTTING BAND SAW

Cuts anything from carbon tool steel to asbestos, in hundreds of applications. Four metal-cutting speeds: 125, 175, 250, 340 f.p.m. change from metal to wood with just a flip of your finger and simple belt change.

SHAPER

E 7" PRECISION METAL SHAPER

This husky "machine of a thousand uses" is extremely popular in machine shops, tool making and model making shops, schools and experimental departments. "V"-type ways on ram, tool head and front face of main frame insure accuracy and longer life.

FINISHING MACHINES

F DEBURRING Machine

The easy, practical, low-cost way to handle a multitude of metal removal operations. Eliminates bother of "set-up wheels" and dressing of "grinding wheels"—inexpensive, long-wearing abrasive belts are easily replaceable. Much lower in cost than any comparable machine on the market.

G ABRASIVE BELT FINISHING Machine

This 6" belt-type abrasive finishing machine is heavy and husky enough to do dozens of sanding, polishing and finishing operations, yet is portable. Operates vertically or horizontally.

H ABRASIVE DISK FINISHING Machine

This machine is ideal for an accurate, fast finishing job. It can be moved to any place in the shop or on the production line. Abrasive disks can be renewed every few minutes if necessary.

WELDERS

I DELTA Combination 5 KVA SPOT and 120 AMP. ARC WELDER

For any shop doing a lot of light duty production spot welding and intermittent arc welding. Unique design, careful engineering and high production methods permit pricing it considerably under two individual welders.

J DELTA 5 KVA Automatic SPOT WELDER

Compared to other spot welders, this compact unit is conspicuous for efficiency and low cost. It is extremely simple and easy to operate, and has an unusually wide range of capacity.

GRINDERS

K Toolmaker GRINDER

As a Chip-Breaker Grinder. With univise and coolant attachment, the Toolmaker surface grinder is a precision machine which grinds the chip breaker groove in carbide tipped tools.

As a Tool and Cutter Grinder. With the Toolmaker tool and cutter grinding attachment, it becomes an economical machine for easy sharpening of tools and cutters.

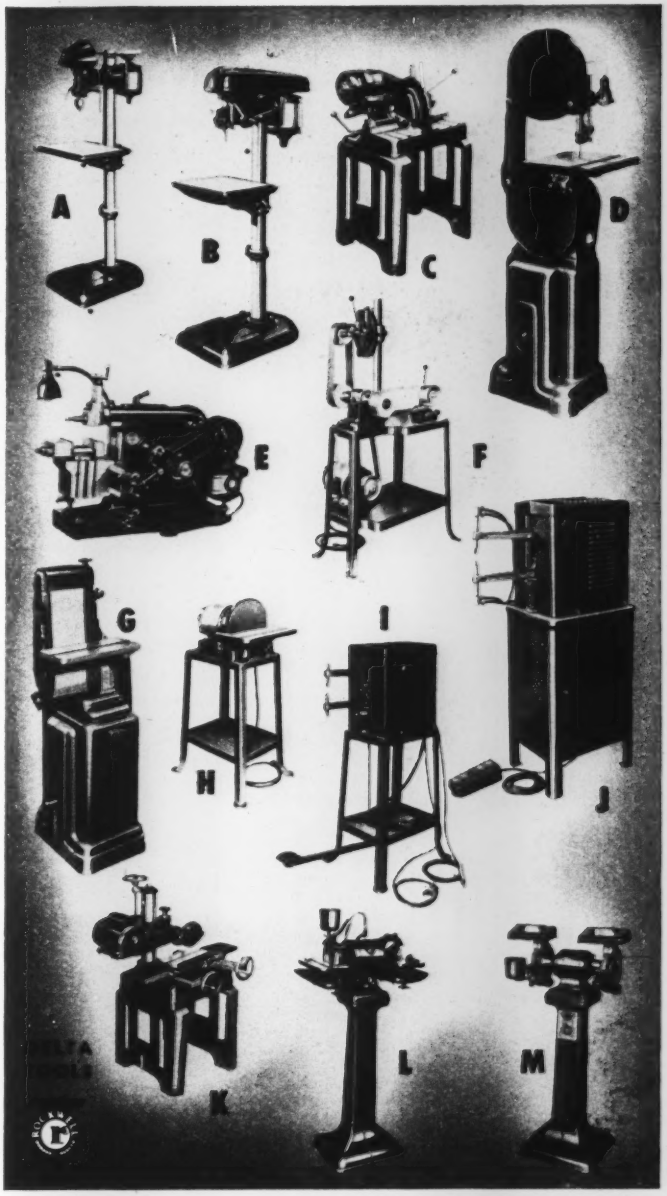
As a Standard Surface Grinder. The basic Delta Toolmaker surface grinder does every type of surface grinding required in the tool room or production shop. It's a big, rugged machine with the massiveness and solidity needed to produce accurate work.

L CARBIDE TOOL GRINDER

Here's the accurate, low cost way to grind your tungsten-carbide tools—the Delta Carbide Tool Grinder. Made in two styles—bench and pedestal—a wide range of motors are available.

M STANDARD TOOL GRINDER

Here's the grinder "that can't forget its goggles." In addition to its unsurpassed safety features, it's a money-saver—sturdy, accurate, highly adaptable, easy to use and low in cost.



There's a Delta Power Tool for Your Job- WOOD OR METAL WORKING 53 MACHINES • 246 MODELS • MORE THAN 1300 ACCESSORIES

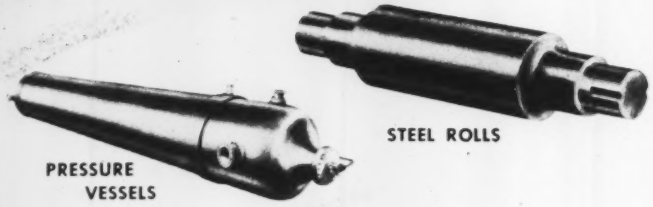
DELTA POWER TOOL DIVISION

Rockwell Manufacturing Company

6381 North Lexington Avenue • Pittsburgh 8, Pa.

BE SURE TO SEE
all of these tools demonstrated
under power at the
1952 METAL SHOW
Philadelphia • October 18-24.

HEADQUARTERS FOR HEAVY STEEL FORGINGS



STEEL ROLLS

PRESSURE VESSELS

PRESS CYLINDER

RINGS

Whatever your needs for heavy steel forgings in industry, Midvale can assure you of the finest in craftsmanship, precision and ultimate performance. Whether it is weldless gear rings for turbine speed reduction . . . cylinders for hydraulic presses . . . weldless high-pressure vessels for oil refining, gas reactions and steam generation or hardened and ground steel rolls for cold rolling carbon and alloy steel, stainless steel, aluminum, copper, brass, zinc, foil, paper, linoleum, plastics and rubber . . . Midvale engineers can help you design them. Midvale craftsmen, with the most modern equipment, will build them to your most exacting specifications. Put your heavy forging problems in our hands.

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NICETOWN, PHILADELPHIA, PENNA.

OFFICES: NEW YORK · CHICAGO · PITTSBURGH
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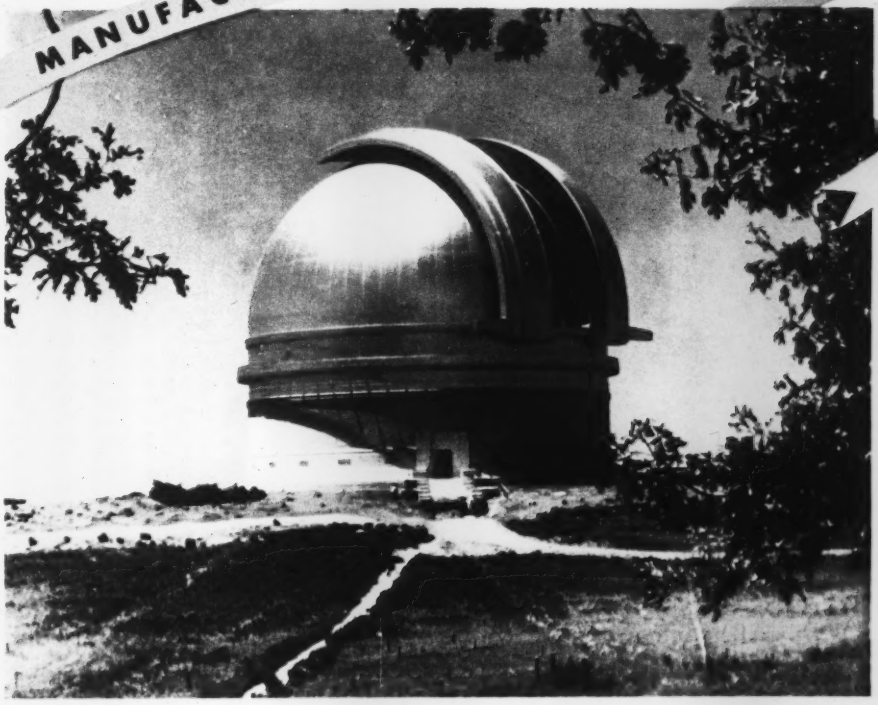
MIDVALE

Custom Steel Makers to Industry

PRODUCERS OF FORGINGS, ROLLS, RINGS, CORROSION AND HEAT RESISTING CASTINGS

BULLARD

MANUFACTURERS OF MACHINE TOOLS



Mount Palomar Observatory — 69 miles north of San Diego, California — Kaufmann & Fabry Photo

The Invisible Background of Industrial Progress

Among the many advancements in our country of free enterprise are the products of scientific research. Representative of such work is Mount Palomar Observatory of the California Institute of Technology. Located 69 miles north of San Diego, California, its 200-inch lens, ground at the University, brings the moon to within 28 miles of the earth. Palomar's big telescope used for photographing celestial objects can reach out to explore a spherical section of the Universe so colossal that light traveling 186,000 miles a second takes 2 billion years to cross the section. Such scientific equipment will permit more complete studies of the Universe and the effects of outlying bodies on our own world . . . In The Invisible Background of Industrial Progress are the manufacturers who use ★ *Modern Machine Tools* that enter into the many steps in the making of glass, grinding of lenses, producing delicate machinery and hundreds of other items required in the innumerable phases of scientific research.

★ *For greater manufacturing economy*
REFER to next page

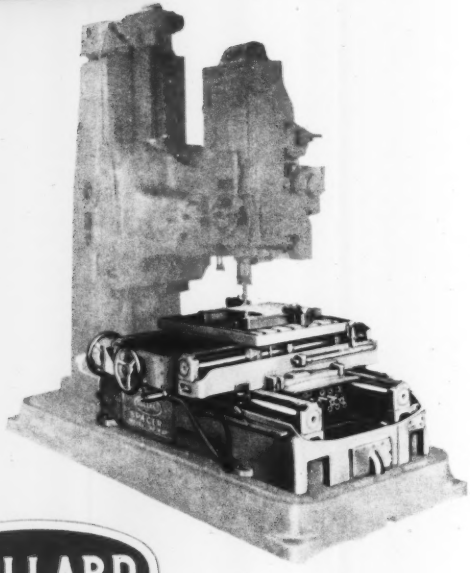
THE BULLARD COMPANY
BRIDGEPORT 2
CONNECTICUT

BULLARD MACHINE TOOLS

FOR GREATER MANUFACTURING ECONOMY

The Bullard Spacer is an ingenious table-like machine designed to be mounted under the arm of an accurate radial drill or the fixed arm of the Cincinnati Super Service Precision drill. When so installed it provides an accurate means of spacing for drilling, boring, reaming and threading several pieces or longer runs of work without the costly medium of jigs.

In actual use, several hundred of these Spacers have not only proved their reproductive accuracy but have shown almost unbelievable savings in manufacturing costs. In many instances it has proved profitable to discard numerous jigs. In others where new products are in the design stage, the spacer operations were laid out and work was quickly put into production, without the usual delay required in jig design and jig fabrication.

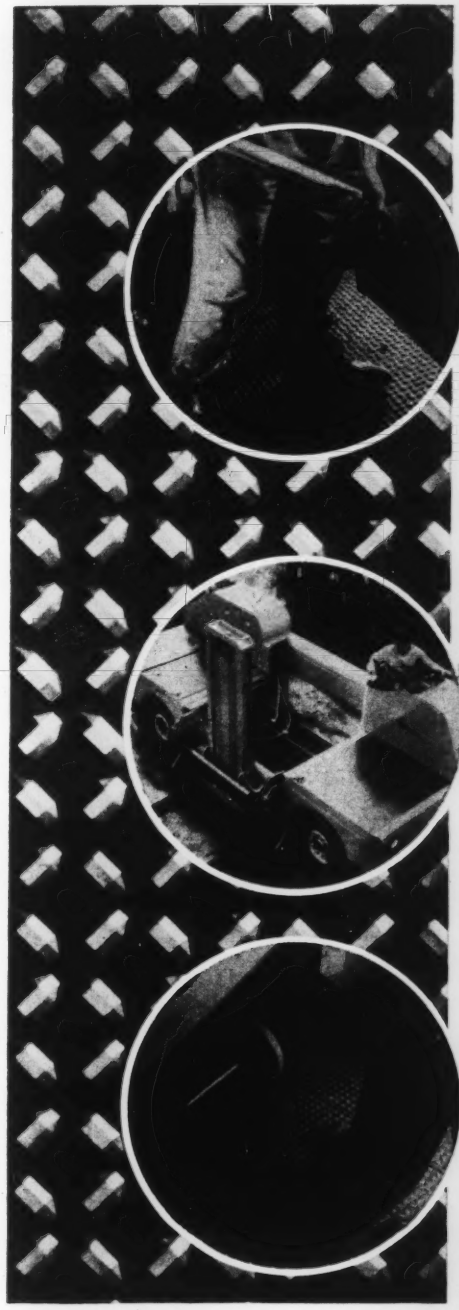


Bullard Spacer with a 32" x 40" table has 30" longitudinal and 20" transverse travels providing for a maximum of 760 hole locations in a single setting of the stops. Write for complete specifications.

BULLARD

THE BULLARD COMPANY

BRIDGEPORT 2, CONNECTICUT



'Cause Multigrip makes footing safe
This man has forged ahead;
He used to have to watch his step . . .
Now minds his work instead!

And Multigrip is gutter-free,
Won't trap a narrow wheel.
For safety's sake use Multigrip,
Produced by U. S. Steel!

●**USE MULTIGRIP** where sure-footing is essential. It will help reduce accidents caused by slips and falls, and resultant lost man hours. It will help increase operating efficiency, for the flat-topped, sloping-edged risers of Multigrip are comfortable to work on, comfortable to walk on . . . tend to lessen fatigue.

Vehicles roll easily, safely on Multigrip Floor Plate. It provides maximum traction for stopping, starting . . . pushing, pulling. There are no gutters to catch a wheel. Multigrip is economical, too. Installations are permanent, reducing plant maintenance costs. It's easily cleaned . . . drains freely in all directions.

UNITED STATES STEEL COMPANY, PITTSBURGH
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, CHICAGO
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S
multigrip
FLOOR PLATE

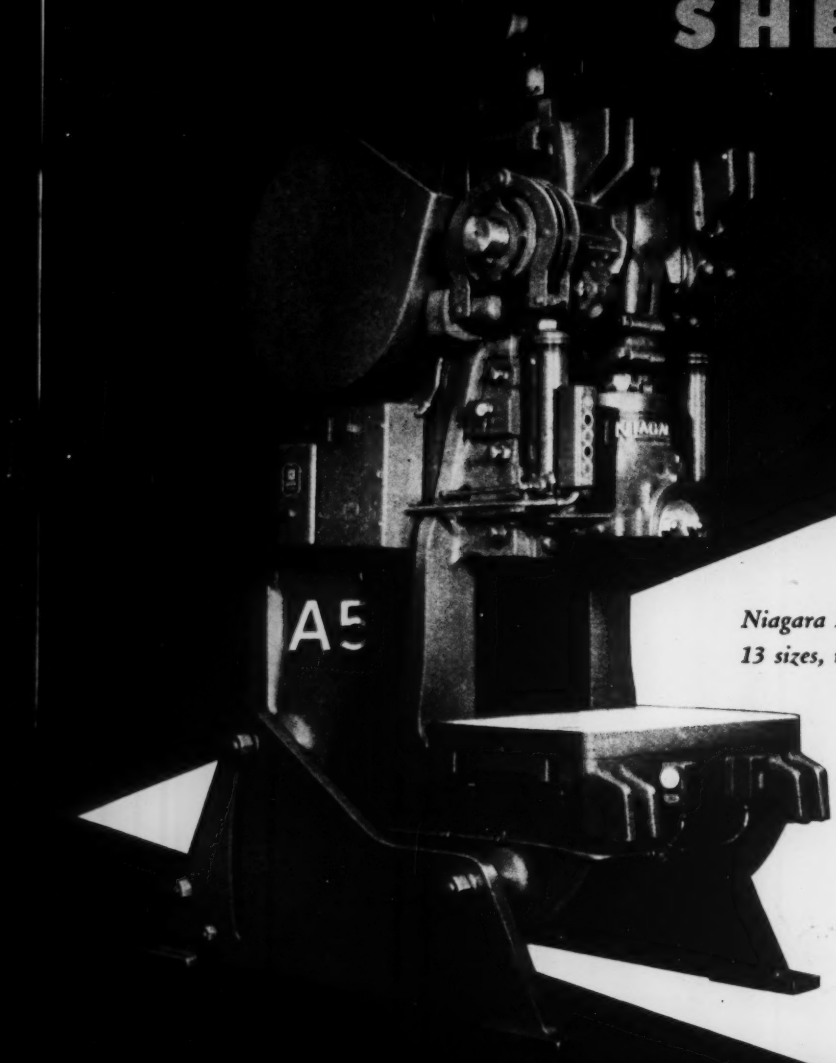
Sold by leading distributors from coast to coast

2-1422

UNITED STATES STEEL

NIAGARA

PRESSES AND SHEARS



Niagara Inclinable Presses.
13 sizes, up to 6 1/2 inch shafts.

NIAGARA MACHINE AND TOOL WORKS, BUFFALO 11, NEW YORK

for Defense Production

• The sound engineering and long practical experience, incorporated in the design and construction of Niagara Presses and Shears, pay dividends in increased production and low maintenance cost . . . two essentials in the defense program.

Write for Bulletins

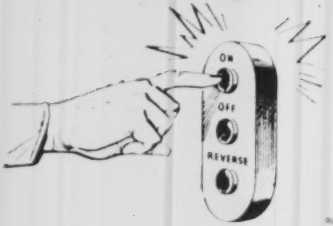
Manufacturers of a Complete Line of Sheet Metal Working Equipment Ranging from Small Hand Tools up to Large Power Operated Machinery.

Niagara Power Squaring Shears. Capacity from shim stock up to 1 inch thick steel. Lengths 3 feet to 20 feet.

DISTRICT OFFICES: DETROIT, CLEVELAND, NEW YORK

Up-End HEAVY STEEL COILS IN 6 SECONDS *Safely*

. . . At the Push of a Finger. . .

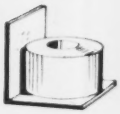


SECO COIL UP-ENDER

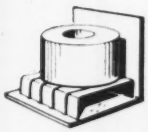
UP-ENDS HEAVY COILS OF STEEL FROM VERTICAL POSITION

TO HORIZONTAL POSITION

OR FROM HORIZONTAL POSITION TO VERTICAL POSITION



OR EASILY LOADS AND UNLOADS PALLETS



You eliminate dangerous, time consuming handling when you install a SECO COIL UP-ENDER! Simply load a coil onto the floor level platform by lift truck or crane. Push the electric control button—in 6 seconds the platforms rotate, automatically up-ending the coil! Palleting coils is just as easy. Simply place a pallet alongside the coil and up-end!

Illustrated is the Seco 15,000 pounds capacity Coil Up-Ender. This compact unit has 64" x 64" platforms. An electric motor with a positive mechanical gear-drive rotates platforms 90°. Limit switches automatically stop platforms in proper positions. Heavy-duty design and construction assures long maintenance-free service. Other models built to handle coils from 5,000 to 30,000 pounds capacity.

WRITE TODAY FOR COMPLETE SPECIFICATIONS AND OPERATING DATA

SECO DESIGNS AND BUILDS STEEL MILL EQUIPMENT

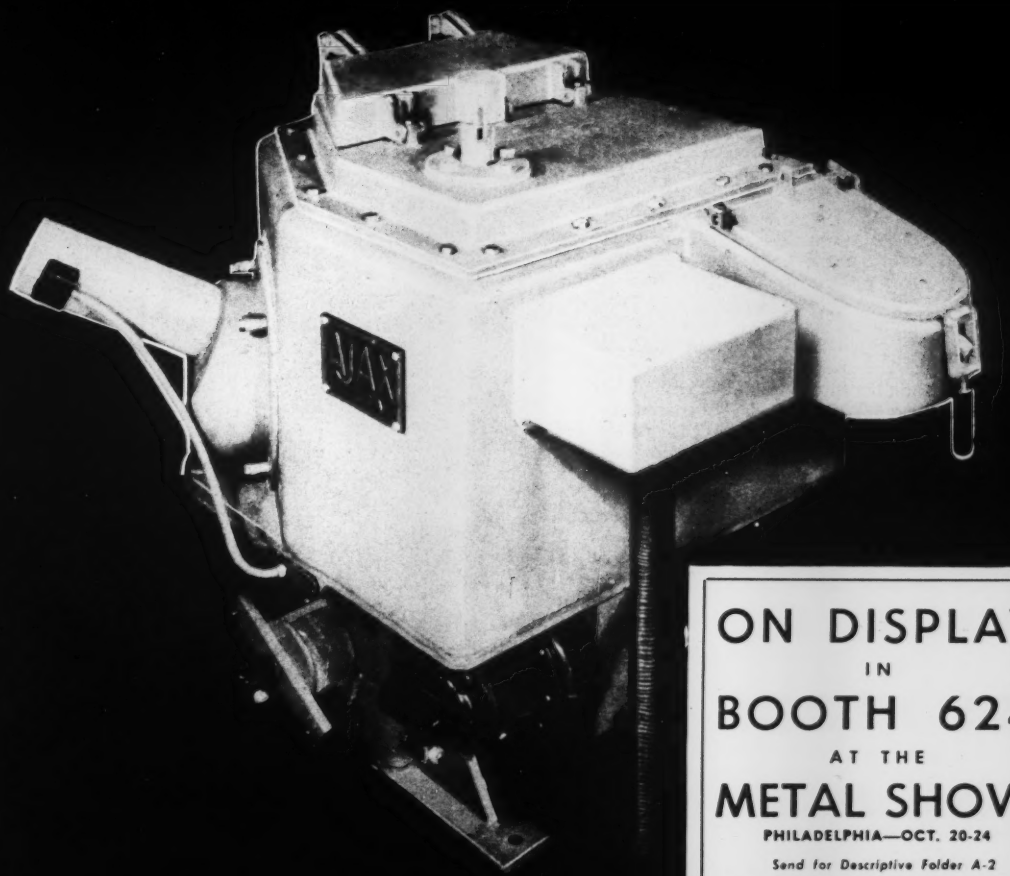
Leveling and Shearing Lines
Combination Edging and Flattening Lines
Tension Reels for Strip Polishers
Narrow Strip Grinding Machines
Multiple Strand Pull-Out Rolls and Take-Up Frames
Strip Coilers of the Up and Down Coiling Types
Traverse Reels for Narrow Strip
Scrap Ballers

STEEL EQUIPMENT COMPANY
P. O. BOX 737, WARRENSVILLE STATION
CLEVELAND 22, OHIO

SECO

AJAXOMATIC

AN AUTOMATIC POURING UNIT FOR THE PRODUCTION OF ALUMINUM DIE CASTINGS



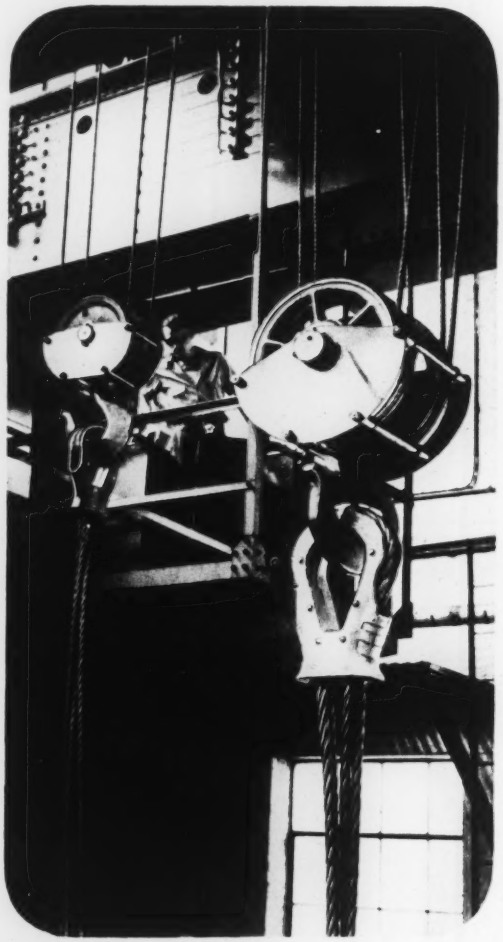
ON DISPLAY
IN
BOOTH 624
AT THE
METAL SHOW
PHILADELPHIA—OCT. 20-24
Send for Descriptive Folder A-2

AJAX ENGINEERING CORPORATION

TRENTON, N. J.

WIRE ROPE

This is the most efficient rope we've ever made for industrial service



JUST MENTION wire rope and most everyone thinks of Roebling. For one thing, Roebling made the first wire rope in America. But what counts more, we've always set the pace in developing better wire and better rope for the needs of every branch of industry.

Today's Roebling Preformed "Blue Center" Steel Wire Rope is industry's best bet for all-around efficiency and long life. It helps you get continuous production and stands up under rough going. It saves you time and cuts costs.

There's a Roebling wire rope of the right specification for top service on any job. Call on your Roebling Field Man for his recommendations. John A. Roebling's Sons Company, Trenton 2, New Jersey.

ROEBLING

ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 1125 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 815 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340E HARBOR ST. • NEW YORK, 19 RECTOR ST. • QUEENA, TEXAS, 1920E 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

American Locomotive Cranes cut Illinois Central's materials handling bill

If you have been thinking about junking an old steam crane, but hesitating because of replacement cost—ask Mr. B. T. Adams, General Storekeeper for the Illinois Central. The husky American Locomotive Crane shown above is one of four purchased within 2½ years at Illinois Central's General Storehouse, Paducah, Kentucky.

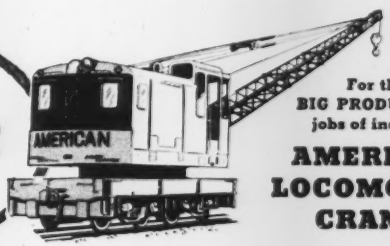
Extremely accurate cost records show a substantial saving on every ton of material handled with the new Americans, as against old steam equipment. Mr. Adams mentions the full work day of the diesels—no stops for coal, or water. Servicing costs are greatly reduced. The new cranes can do more jobs, at higher speeds than any off-track equipment can match. Fuel economy is a big item. All of this, says Mr. Adams, "makes replacement a very attractive proposition."

Perhaps you can find even greater advantages in American DiesELectric cranes, built on our patented design. We offer Diesel and DiesELectric types in capacities from 25 to 80 tons . . . America's largest-selling line of locomotive cranes.

2605

Modernize...economize...with

American Hoist
& Derrick Company
ST. PAUL 1, MINNESOTA



For the BIG PRODUCTION jobs of industry...
AMERICAN LOCOMOTIVE CRANES

Specialists IN "Specials"

"Specials" are ball bearings which have been custom designed to be "exactly right" for a particular application. Thus, the field for specials ranges from modification of existing standard bearings to complete new bearings of unusual shapes and dimensions. As "specialists in specials," experienced NICE engineers take advantage of every design opportunity to reduce costs without sacrifice of quality and to improve product performance and appearance.

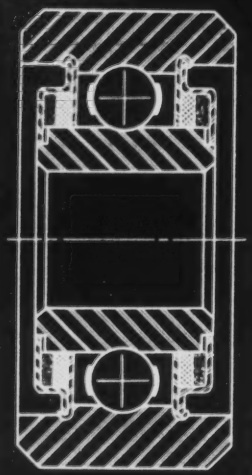
SPECIAL BEARINGS

of unusual shapes and dimensions

Representative of Nice ingenuity is No. 6866, a cam follower on an agricultural harvester. No. 6866 replaces a precision bearing pressed into a specially machined outer tire . . . and the resulting improvements were:

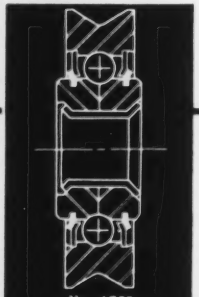
1. LOWER COST (OVER 30% SAVINGS).
2. INCREASED CAPACITY.
3. MORE EFFECTIVE SEAL.
4. PACKAGED INTERCHANGEABLE UNIT.
5. IMPROVED APPEARANCE AND PERFORMANCE.

Characteristic of agricultural machinery, severe dust and dirt problems dictated the need of an efficient and rugged seal. No. 6866 seal has proved to be highly effective and durable.



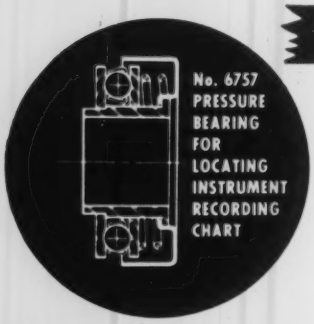
NO. 6866 CAM FOLLOWER

Where new tooling is justified by the quantities involved, specials of this type, where applicable, offer the greatest possibilities for cost savings and product improvement. A few typical application examples are illustrated.



No. 6750
BALING MACHINE
WIRE GUIDE

SEMI-PRECISION "SPECIALS"



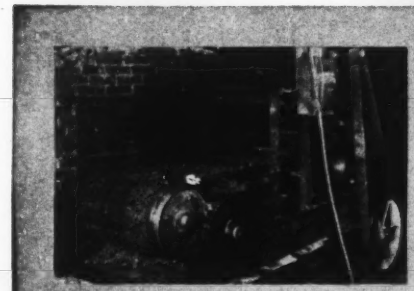
No. 6757
PRESSURE
BEARING
FOR
LOCATING
INSTRUMENT
RECORDING
CHART

Many precision bearing applications do not require all of the elements of precision that are normally incorporated in a standard precision unit. For example, if the bearing cone is locked against a step on the shaft, grinding of the bore can be eliminated and will save approximately 10% of the selling price of a 2" OD precision annular bearing. Similarly, if the loads are not severe nor the RPM excessive, polishing of the ball grooves may not be necessary and will reduce the cost about 10%. In a light load application, the outer ring material can be changed to a less expensive steel at a savings of as much as 8% of the selling price.

THE USE OF SEMI-PRECISION BEARINGS, WHERE INDICATED, MAY REFLECT SUBSTANTIAL SAVINGS TO THE MANUFACTURER WHO BUYS BEARINGS IN PRODUCTION QUANTITIES.

NICE

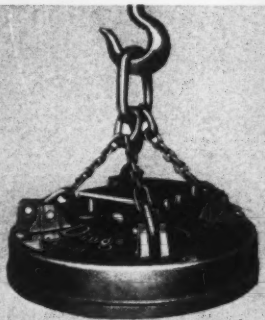
NICE BALL BEARING COMPANY
NICETOWN · PHILADELPHIA · PENNSYLVANIA



Dings non electric pulley-type scrap separator in operation at a die cast plant.

Dings Extra-Powerful Self-Cleaning Rectangular takes iron out of shakeout sand.

1 2 3 4



Dings Cool Operating Lifting Magnet.

Dings "Hold Tite" magnetically holds castings in position for swing grinding.

4 MEANS TO GREATER EFFICIENCY

THE four Dings Magnets illustrated save time, labor, metals and money by doing their specific jobs more efficiently than any other method. Compare the advantages they offer over your present methods:

1 **FOR CRITICAL SCRAP SEPARATION** — Example: *A Non Electric, Permanently Magnetic Pulley Type Separator.* The magnetic PERMA-PULLEY, installed as head drive pulley in a completely self contained belt conveyor unit, takes iron out automatically, without attention, without electricity, without maintenance. Portable models available. Other types to meet any scrap separation requirement.

2 **A SAND HANDLING COST CUTTER** — *the Suspended Self Cleaning Rectangular.* Great power enables magnet to handle the particularly difficult iron extraction jobs. Self cleaning feature makes operation automatic, eliminates "carry-over" of sand with iron.

3 **THE IDEAL SCRAP LIFTING MAGNET** — Lifts more because it's cooler operating. Light weight, moisture-proof, rugged, 4-point chain suspension.

4 **"HOLD TITE" MAGNET CUTS GRINDING LABOR COSTS UP TO 25%** — Firmly holds all shapes of castings up to 1000 lbs. in position for swing grinding. Can be tilted to 7 different positions. Simple to install.

For details on any of the above magnets, use the coupon below.

SEND THIS COUPON
OR DROP A POSTCARD

Dings: Send me Catalog containing full information on: 4710

☐ Scrap Separators ☐ Lifting Magnet
☐ Rectangular ☐ "Hold Tite"

NAME_____

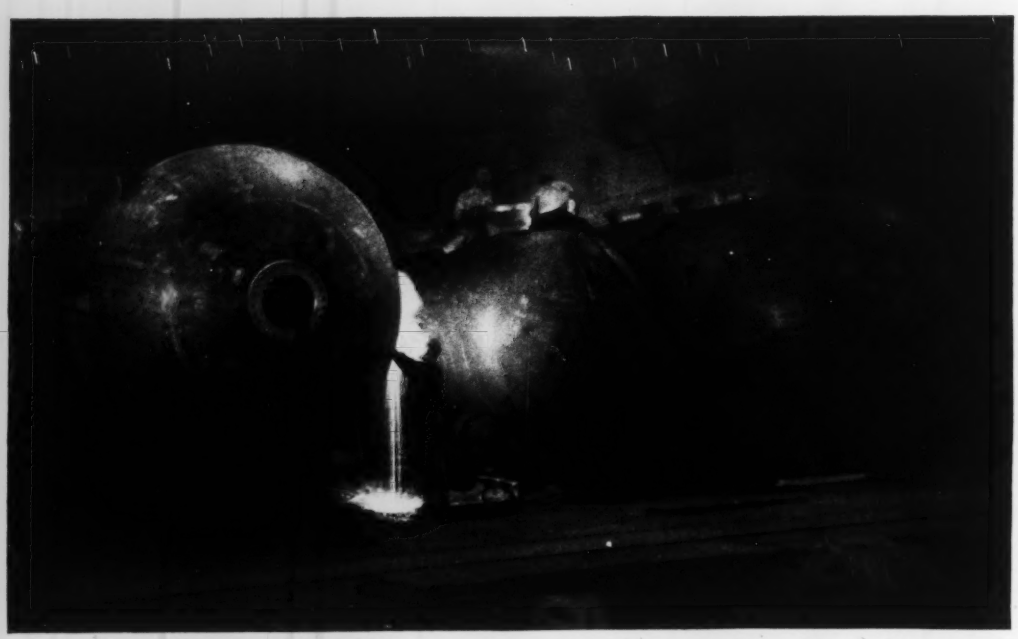
COMPANY_____

ADDRESS_____

S

Dings

MAGNETIC SEPARATOR CO.
4709 West Electric Avenue, Milwaukee 46, Wisconsin



An excellent example of Graver's skill in fabricating pressure vessels is this 10' x 32' desalting tank for use in a new refinery unit now under construction. The tank was built for an operating pressure of 300 psi.

Something Special

IN PRESSURE VESSELS

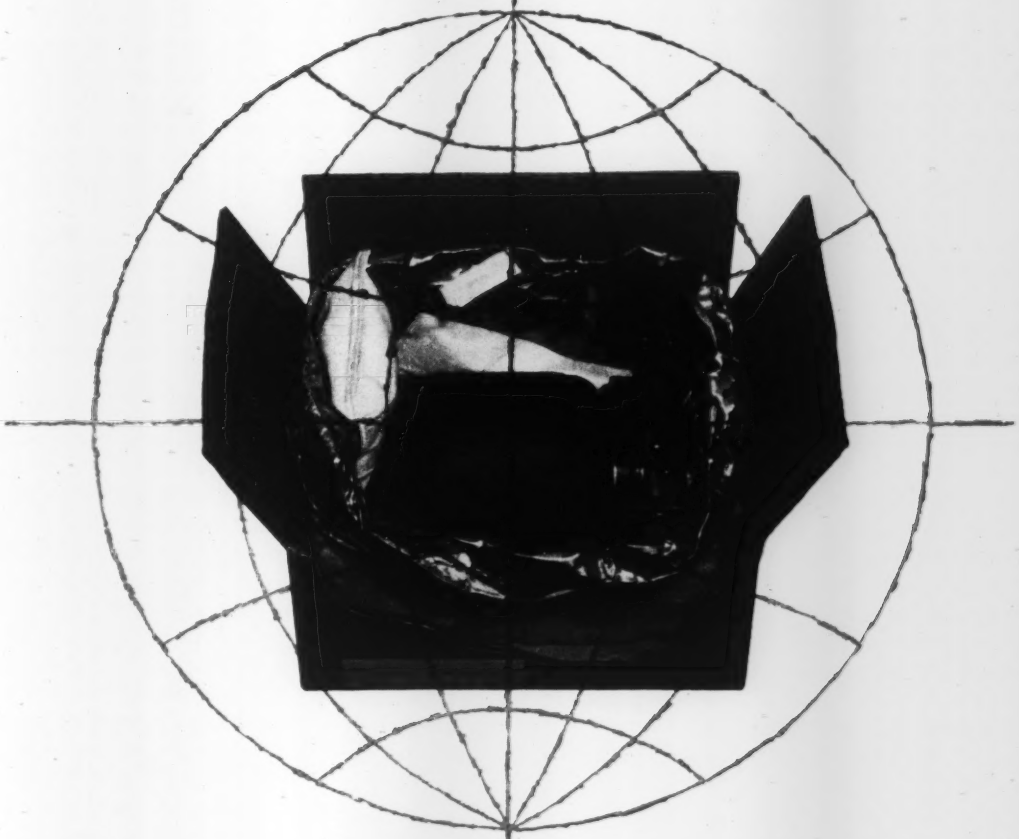
The steady growth of the petroleum, petro-chemical and chemical industries has greatly increased the demand for specialized equipment, particularly new types of pressure vessels.

Graver's production facilities and skilled craftsmanship have provided the answer to pressure vessel problems for many years. Every Graver-built pressure vessel is fabricated in accordance with the ASME Code for unfired pressure vessels, the API-ASME Code as adapted to the special requirements of the petroleum industry, or to the even more stringent requirements set by customers. Complete X-raying, stress relieving and equipment for rigid inspection are additional features which assure that every fabrication will measure up to the requirements expected of it.

Whether fabricated in steels, clads or alloys, every pressure vessel bearing the Graver nameplate bears the symbol of quality.

GRAVER TANK & MFG. CO., INC.
EAST CHICAGO, INDIANA
NEW YORK · CHICAGO · PHILADELPHIA · DETROIT · WASHINGTON
CINCINNATI · CATASAUQUA, PA. · HOUSTON · SAND SPRINGS, OKLA.

From the Equator to the North Pole Dobeckmun Barrier Materials are Safe!



No matter where your product is shipped, Dobeckmun Barrier Materials will help it give top performance when it arrives, or after it has been stored for months. From sizzling heat to 65° below zero, Dobeckmun Barrier Materials prove their superiority in military packaging . . . remaining flexible, grease-proof, acid-free and non-corrosive at all times. Dobeckmun is the pioneer and leader in the Barrier Material field.

Metalam® qualifies under the following specifications:		*Benbar® qualifies under the following specifications:*
MIL-B-131A, *Classes A & B*	AN-B-20, *Type II*	JAN-P-117, *Type I, Grade A, Classes a, b, c*
MIL-B-131A, *Class D*	JAN-P-117, *Type II, Grade A, Class d*	JAN-P-117, *Type II, Grade A, Classes a, b, c*
MIL-C-6056, *Type III*	JAN-P-131, *Type I, Classes A & B*	JAN-B-121, *Type I, Grade A, Class 1 (regular and stretchable)*
MIL-E-6060, *Type II*	JAN-P-131, *Type I, Class D*	JAN-B-121, *Type II, Grade A, Class 1 (regular and stretchable)*
MIL-B-7841 (Aer), *Classes 1 & 2*		

The Dobeckmun Company, Cleveland 1, Ohio • Berkeley 2, California • Bennington, Vermont

So You Want to Make a MILLION?

...then follow this procedure

1. Get CARMET carbide metal dies and equip your presses with them.
2. Make 1,000,000 small stampings a day with only *one* grind per day.
3. Save $56,907 annually by using Carmet, as shown in the following cost comparison:

WITH CARMET		WITH HI-CARBON, HI-CHROME	
★ 4½ Dies per year	$30,600	★ 22 Dies per year	$ 46,750
★ Punch Replacements per year	$(none)	★ Punch Replacements per year	$ 6,600
★ 260 Grinds per year	$14,560	★ 4,420 Grinds per year	$ 47,424
★ Diamond Wheel Cost per year	$ 792	★ Abrasive Wheel Cost per year	$ 2,085
ANNUAL COST WITH CARBIDE	$45,952	ANNUAL COST WITH FERROUS	$102,859

4. Make millions *more* precision pieces a year than you could with hi-carbon, hi-chrome dies!

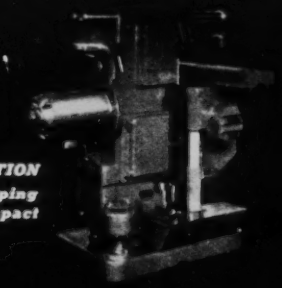
Ask the Carmet representative to figure out the potential savings and increased production for you in terms of your own work. ● *Allegheny Ludlum Steel Corporation, Carmet Division, Wanda & Jarvis Avenues, Detroit 20, Michigan.*

For complete **MODERN** Tooling, call

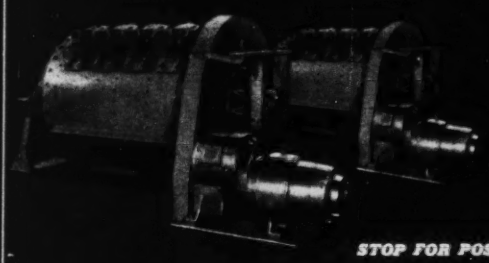
Allegheny Ludlum

WSD 4066

AL FINE TOOL STEELS SINCE 1854



SPEED UP PRODUCTION
Save time by stopping quickly with a compact integral brake unit



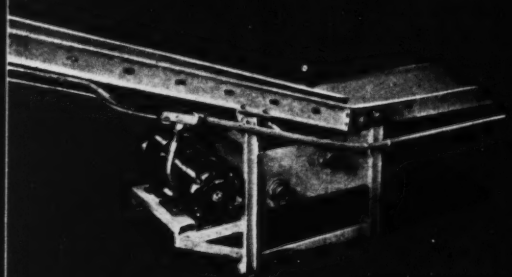
STOP FOR POSITION
Stop at the desired point for quickly and conveniently loading and unloading

MASTER

UNIBRAKE MOTORS

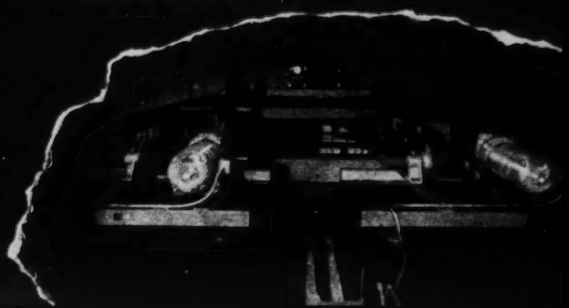
1/8 TO 125 HORSEPOWER

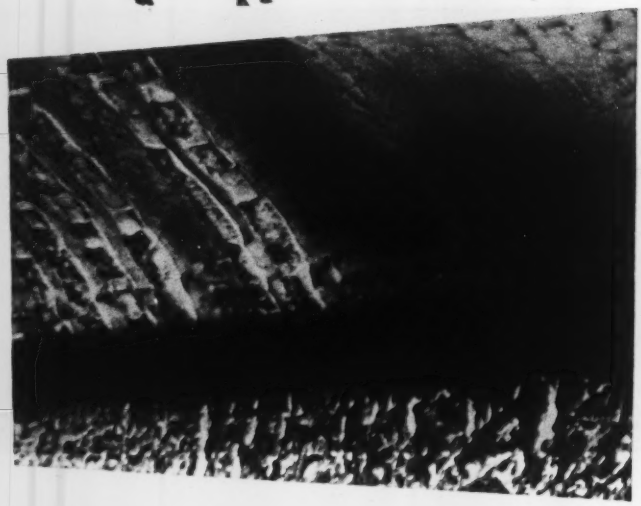
THE MASTER ELECTRIC COMPANY • DAYTON, OHIO



STOP FOR SAFETY
Reduce the hazard of injury to workmen or damage to equipment which might cripple vital production

STOP AND HOLD ANY LOAD
Unibrake motors are very advantageous on hoist, elevators, inclined conveyors, etc. . . .





Revolutionary

"ZEBRA ROOFS", built with alternate rings of silica brick and patented STEELKLAD-40 give top performance when open hearths are pushed for peak production. Unretouched photo shows marked superiority of ZEBRA section (on the left) over surrounding silica brick. Many operators report increased roof life despite higher tonnage. Others find reduced repairs to roof and backwalls. More and more plants are standardizing on ZEBRA roofs. Best results are obtained with 3" Silica Keys alternated with 3" or 6" of STEELKLAD-40.

A Complete Refractories Service

GREFCO BASIC BRICK For All Industry

The metallurgical industry demanded furnace linings capable of withstanding extremely high temperatures under extraordinary operating conditions. To meet this challenge, Grefco research produced the famous RITEX unburned basic brick—one of the outstanding advances in the entire history of brick manufacture. RITEX brick possess great accuracy to specified dimensions. They are more resistant to thermal spalling . . . offer lower porosity, lower thermal conductivity, and higher hot strength. These properties insure increased service at reduced cost.

STEELKLAD For Tough Duty

For service too tough even for RITEX, Grefco offers STEELKLAD, an unburned basic brick, permanently jacketed in a patented steel shell. The brick will not slide from its shell in the construction of a furnace wall. When the furnace is heated the steel oxidizes and is absorbed by the brick. It provides an exceptionally efficient monolithic lining that outlasts all other brick in basic open-hearth steel furnaces, electric-arc furnaces, soaking pits, copper smelting and refining furnaces, and other basic metallurgical furnaces.

Take A Look At STEELKLAD

Shown at the left is a typical STEELKLAD basic brick, steel-jacketed on the four major faces, and containing Grefco's unburned magnesite-chrome brick. The brick itself is exclusive and patented—as is the permanent steel shell. It may mean major savings in your operation.

Child's Play... *made with brick!*

● Skating down the sidewalk . . . thanks to bearings made with brick. Tiny steel bearings, little brothers to the precision-ground bearings that help move the wheels and shafts of American industry.

The production of steel for bearings—chemicals, glass, metals, for most everything else we use—depends largely on refractories to contain the high temperatures necessary in the furnaces of industry. Such products as Grefco silica brick, a favorite in electrical-steel and open-hearth furnaces, and in coke ovens.

General Refractories Company is one of the two largest producers of silica brick in the world.

Grefco silica brick are available in ever-increasing supply to meet the demands of American enterprise. And, like the thousands of other refractories products made by Grefco, they are the subject of constant research to assure their top quality.

If there's a smokestack in your business—call on the *complete refractories service* offered by Grefco.

GENERAL REFRACTORIES COMPANY

PHILADELPHIA

Saves on power costs under load — and during idle and no-load periods!

Cuts maintenance costs and downtime delays — has no moving parts to wear out!

Protects the primary input line against unbalanced conditions!

New P&H DC Rectifier Welder with Dial-lectric Control

. . . Gives you economy, quiet operation, balanced-line loading, and instantaneous remote control

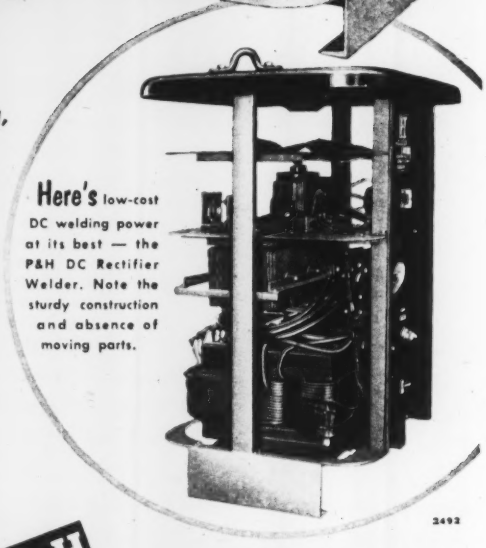
Now . . . you get low-cost DC welding current without a generator, from this new P&H DC Rectifier Welder — industrial twin to the famous P&H AC Dial-lectric Welder.

No troublesome mechanical devices to control amperage — simply turn a single radio-type knob. There are no moving coils or cores to cause delays and maintenance expense — no bearings, brushes, commutator, brush riggings, etc. to replace.

P&H extra-value features like these make this DC Rectifier a real buy: Thermal overload protection. Weather-proof housing. Primary line switch. Range switch. Remote control receptacle. Forced air ventilation. Hinged side covers. Heavy-duty lifting eyes.

New P&H Rectifiers are coming off the production line now. Two sizes: 200 and 300 Amps at 40 V. Be among the first to enjoy the savings this P&H welder helps you realize on power consumption and maintenance. Order your P&H DC Rectifier Welder today.

Ask your P&H representative or distributor for further information on this outstanding unit.



Here's low-cost DC welding power at its best — the P&H DC Rectifier Welder. Note the sturdy construction and absence of moving parts.

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HARNISCHFEGER CORPORATION

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Power Shovels • Crawler and Truck Cranes • Overhead Cranes • Hoists • Arc Welders and Electrodes • Soil Stabilizers • Diesel Engines • Pre-Fabricated Homes

Reynolds
ALUMINUM REPORTER

★ ★ ★ Eleventh in a Series to Industry on Aluminum Uses and Developments ★ ★ ★

ALUMINUM SPECIFIED IN NEW TRAILER DESIGN

Butler Aluminum Buildings Considered Wise Investment By Satisfied Owners

Aluminum buildings are enjoying wide popularity in all sections of the country. Proof of this is found in the large scale operations of the Butler Manufacturing Company ... manufacturer of a wide variety of prefabricated buildings for industrial, farm and commercial use ... and a user of Reynolds Aluminum.

Illustrated below is one of the many types of aluminum buildings produced by the Butler Company of Kansas City, Missouri.

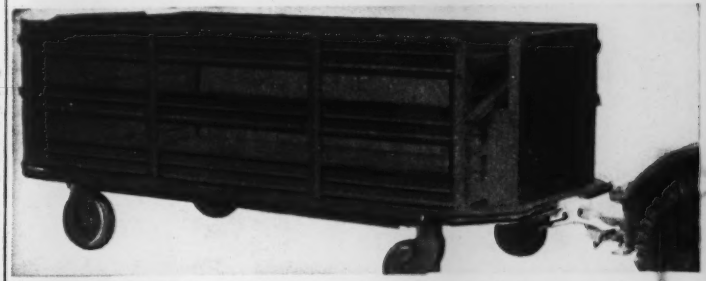
This is a 120′ x 260′ x 14′ (multiple 60′) building that houses the engineering office of a well known maker of battery plate separators. A similar building, 120′ x 260′ x 20′ is used for manufacturing and warehousing by the same company. Like other owners of Butler engineered buildings, this manufacturer reports complete satisfaction with the aluminum roofing and siding.

Owners of Butler aluminum buildings say they are durable, rustproof, never need painting and require very little maintenance. Occupants also mention that aluminum buildings are more comfortable both in hot and cold weather, because the aluminum so effectively reflects away sun's rays in summer and retains inside heat in winter.

How can the durable, heat reflecting, rustproof, low maintenance qualities of aluminum improve your products? Send for the complete index of Reynolds literature covering all phases of design and fabrication. And, if yours is an architectural application, ask for the Architectural Aluminum Folio. Please request on business letterhead, otherwise the price is one dollar. Write Reynolds Metals Co., 2576 South Third Street, Louisville 1, Kentucky.

Visit The Reynolds Metals Exhibit • Booth No. 1550 National Metal Congress and Exposition Philadelphia • Oct. 18-24

Choice Of Aluminum Pays Dividends In Performance



The Model 130 Tobey Flexi-Truck shown above, illustrates another case where leading design engineers are employing special aluminum extrusions, standard structurals, sheet, castings and other forms of aluminum in new and improved designs.

Aluminum Chuck Offers Definite Advantages in New Screwdriver Kit

This inexpensive Screwdriver Kit is a good example of designing for the best use of each material. Five interchangeable screwdriver blades are steel. The handle is plastic. An all aluminum chuck securely joins handle and blades—provides five screwdrivers in a compact carrying case.

The manufacturer states: "Here are the four basic reasons for using aluminum in the screwdriver chuck: 1. The superior machining qualities of aluminum. 2. Rust protection without special finishes. 3. Positive spring and tension action. 4. Aluminum helped reduce weight.

The Screwdriver Kit is made by Schneider and Shier, Inc., 6457 N. Sheridan Road, Chicago, Ill., prominent manufacturers and distributors of premium promotion items.

In this airline baggage trailer, aluminum structurals and extrusions are used for the bed frame, ends and side gates. The wheels as well as corners for the bed and end frames are aluminum castings. End panels are aluminum sheet and the front hitch is bolted to a structure made of aluminum angle and plate.

The Model 130 is conservatively rated at 3,000 pounds load capacity at 20 miles per hour and, thanks to aluminum, weighs only 430 pounds (approximately). Three empty Flexi-Trucks weigh less than one empty steel trailer of the same size and capacity. Thus more pay load per trailer can be moved safely, with less effort and at higher speeds.

The Flexi-Truck is made by the Tobey Manufacturing Corporation, El Segundo, California, leading designers and manufacturers of light weight, heavy duty material handling equipment. The manufacturer says, "Good construction combined with light, strong resilient aluminum offers warehousemen and material handlers substantial savings through easier operation, greater strength, corrosion resistance, and a durability not to be found in equipment constructed from other materials."

To get similar advantages in your products have a Reynolds Aluminum Specialist work with you on new or redesign problems. This assistance is yours without obligation through the Reynolds office or distributor listed under "Aluminum" in your classified telephone directory. Or, if you prefer, write direct.

For a free copy of the 130 page, 6" x 9" Aluminum Structural Design handbook, and a complete index of other Reynolds literature, write on business letterhead (otherwise price is $1.00) to Reynolds Metals Company, 2576 South Third Street, Louisville 1, Kentucky.

MORE INTERESTING NEWS ABOUT ALUMINUM ON NEXT PAGE

(Advertisement)

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HERE COMES HELP!

from your nearby Reynolds Aluminum distributor

Reynolds is putting forth every effort to ease your aluminum-buying problems. To meet the growing demand Reynolds Metals Company and other U. S. producers have already started on another vast expansion program which will greatly increase the country's aluminum production capacity.

To meet your immediate problems the nearby Reynolds distributor listed below is doing his level best to fill orders from limited stocks.

You can also count on his assistance and guidance in selecting temporary alternate materials. He will apply all of his experience and energy to helping you out. Present your procurement problems to him. Now as always he will give you the kind of service you need and want.

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Tay-Holbrook, Inc., San Francisco
Union Hardware & Metal Co., Los Angeles
United States Steel Supply Div., Los Angeles
Western Metal Supply Company, San Diego

COLORADO
Marsh Steel Corporation, Colorado Springs and Denver
Salt Lake Hardware Co., Grand Junction

CONNECTICUT
American Steel & Alloys Corp., Hartford

DISTRICT OF COLUMBIA
Lyon, Conklin & Co., Inc., Washington

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Southern States Iron Roofing Co., Jacksonville, Miami, Orlando and Tampa

GEORGIA
Southern States Iron Roofing Co., Albany, Atlanta, Augusta and Savannah

IDAHO
Salt Lake Hardware Co., Boise

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KENTUCKY
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Lyon, Conklin & Co., Inc., Baltimore

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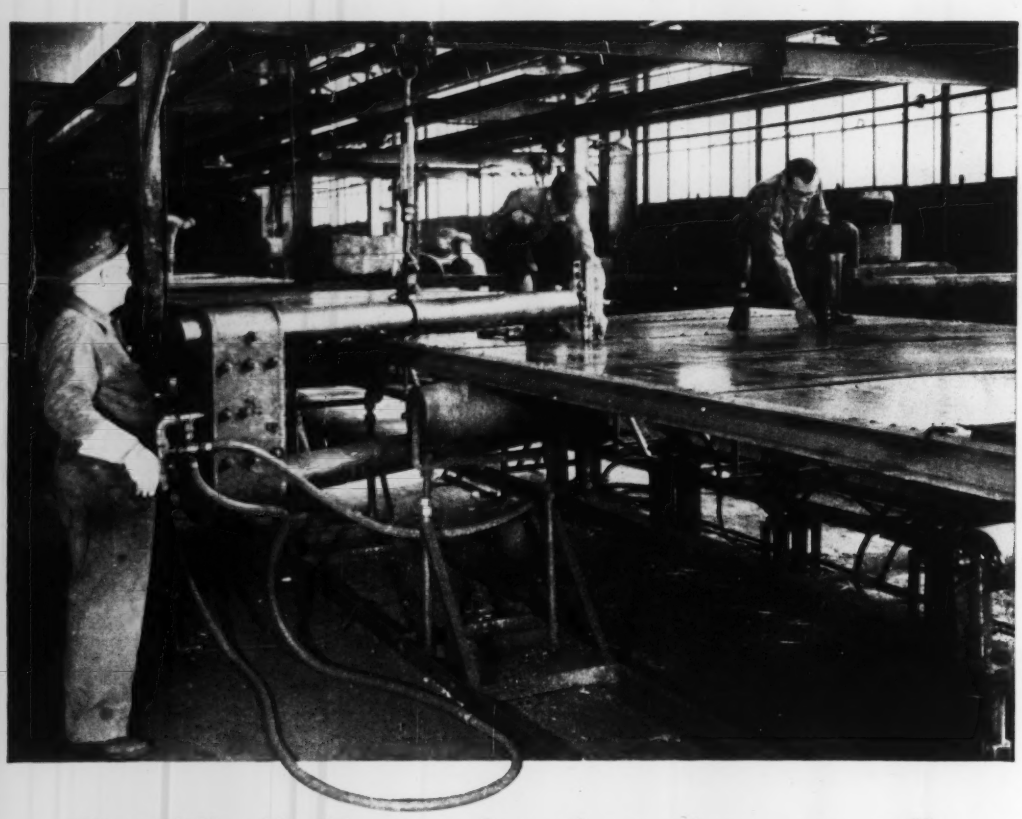

Republic Air Hose makes these rivet guns talk

● And it's a loud voice, too, as nearly 300 rivet guns bark out the signals that mean new railway cars in the making!

The partially fabricated cars simultaneously roll down several production lines, halting only momentarily for the embrace of husky cross hammers that sew up the metal seams with a steady, sure power beat delivered through Republic Air Hose.

As you can see, it's no easy life for a hose!

The floor's concrete and littered with sharp scraps of metal. The constantly flexing hose lies at the workman's feet. Sometimes he stands on it; sometimes he gives it a healthy kick as he jockeys for position over a line of rivets.

But despite the kicks and cuts and bruises and the high pulsating pressures, expected on jobs like these, Republic's Air Hose continues to deliver.

It's so good, in fact, that this particular manufacturer has been using Republic Air Hose since 1929. The hose is bought in long reels and, as required, lengths are cut for use on the giant forming presses, riveters, paint guns, dryers . . . in fact, Republic Air Hose is used on every bit of air-operated equipment in this plant.

And naturally, it's all purchased from a local Republic Distributor, who's always available for immediate deliveries or on-the-spot advice regarding proper selection and care of all types of Industrial Rubber Products.

There's a Republic Distributor near your plant who can give you similar service. Get to know him now!

Simply drop us a card and we'll have him call at your convenience.

Remember, Republic has been **the** specialist in the field for 52 years and—**if it's made of rubber, Republic builds it better!!**

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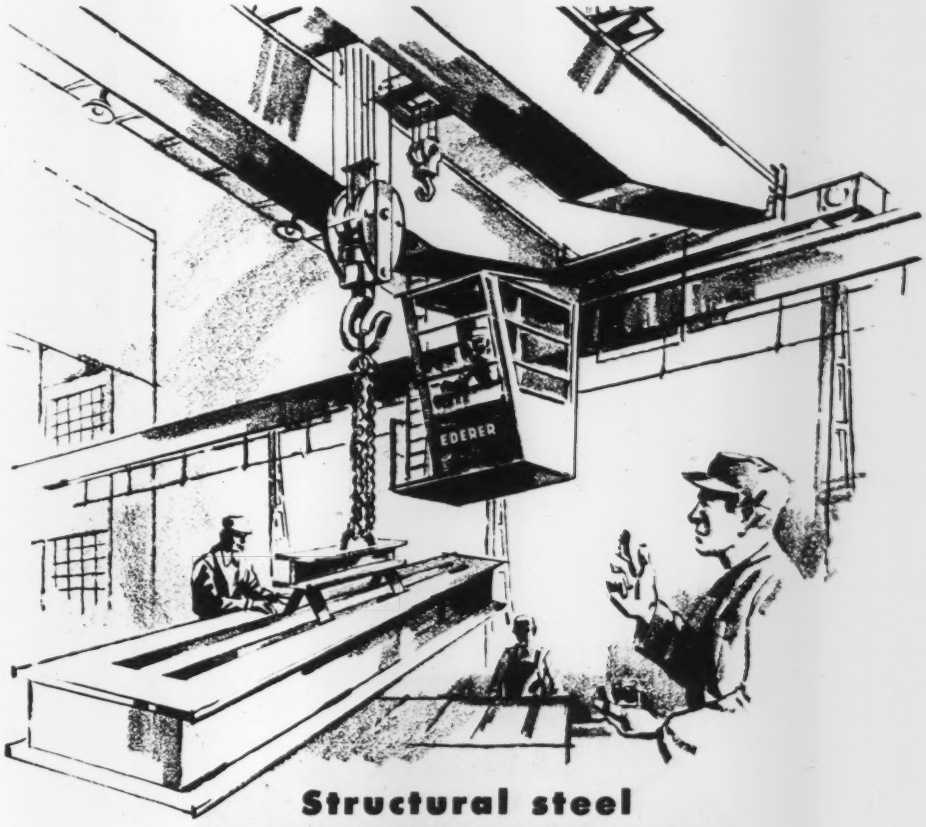

Structural steel handling the EASY way

This 80-foot EDERER crane is just one of the EDERER cranes "job-engineered" for the Pacific Car & Foundry's large steel fabricating plant in Seattle. Capacity of the crane is 15 tons with a 5-ton auxiliary hoist—a combination designed to meet the exact requirements of the structural shop where the crane is installed.

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Look over the list below. It contains the most popular items in our current literature list. Surely, several of them are of interest to you. Just check the numbers on the coupon corresponding to the numbers of the ones you want and mail it in. You'll receive your literature promptly.

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2 REX® LUMBER MILL CHAINS—Complete descriptions with photos of all Rex Chains used in the lumber, pulp, and paper industries.

3 REX STOCK SPROCKETS—Rex Sprockets, carried in warehouse stock for over-the-counter sale, cataloged by chain type and size.

4 REX TABLETOP® CHAINS—The story of TableTop, the ideal chain for smooth, steady, tip-free conveying of containers and small parts.

5 REX Z-METAL CHAINS—A description of Rex Chains cast of Rex Z-Metal . . . approximately 25% stronger than highest quality malleable iron.

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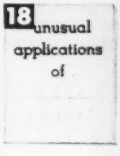

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That doesn't mean it is a "bargain" bearing. It isn't. Its low cost reflects: 1—ingenious steel-cage instead of bronze-separator construction; 2—years of know-how in cost-cutting methods; and 3—mass production by modern, high-speed, high-precision machinery and metallurgical facilities.

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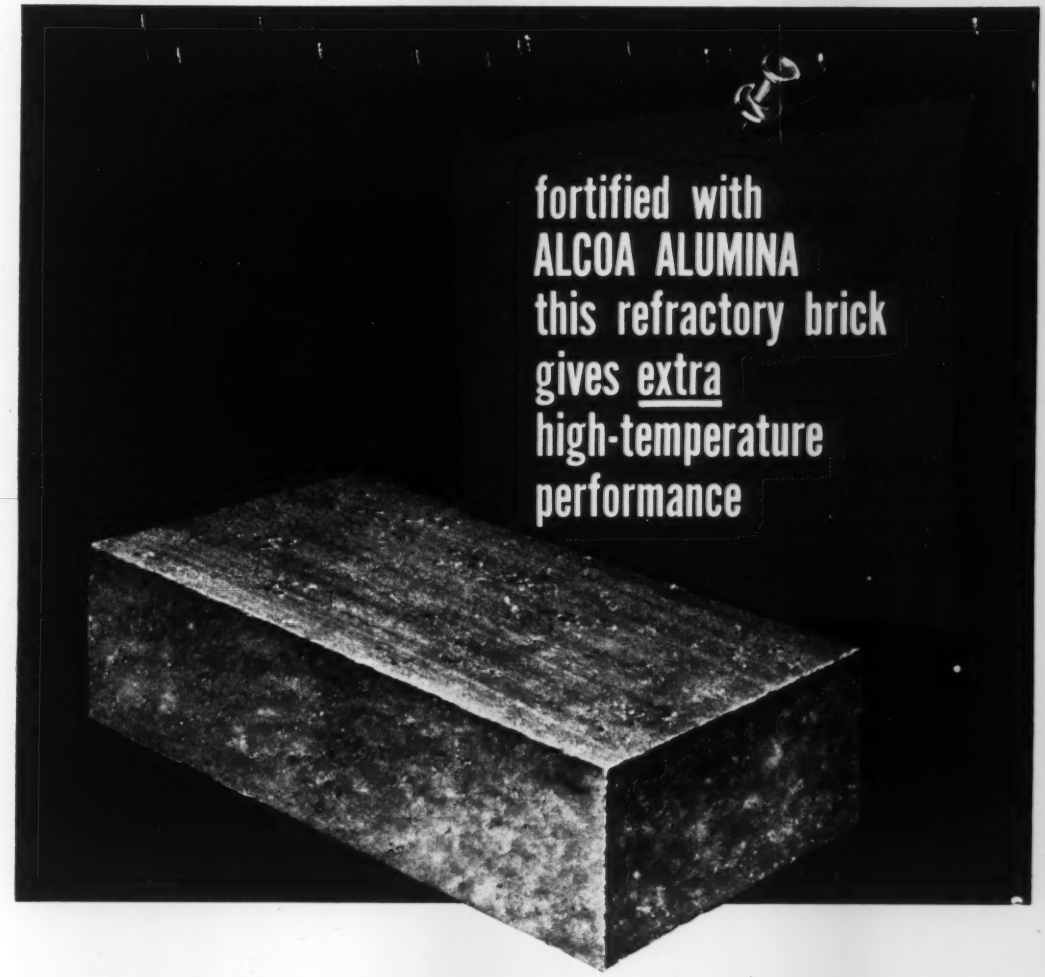

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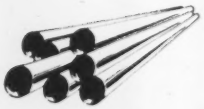

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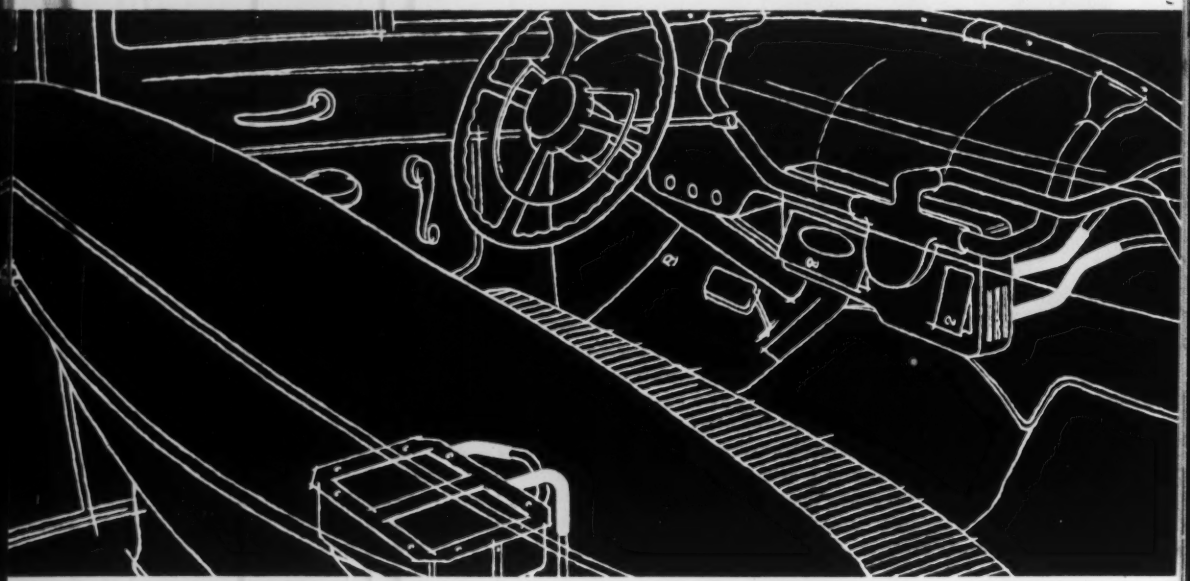
METALFLO is fabricated in O.D.'s of ¼" through 1¼" in wall thicknesses of .035" and lighter. It is also available in cut or random lengths, or formed to your specifications.



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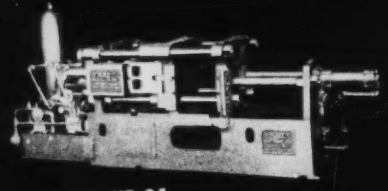

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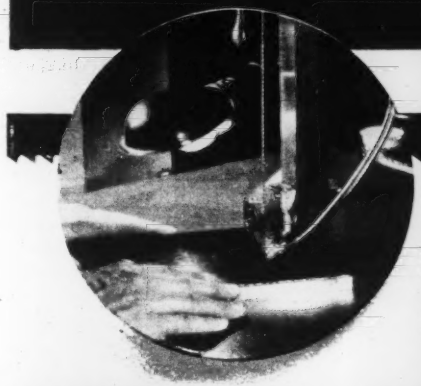
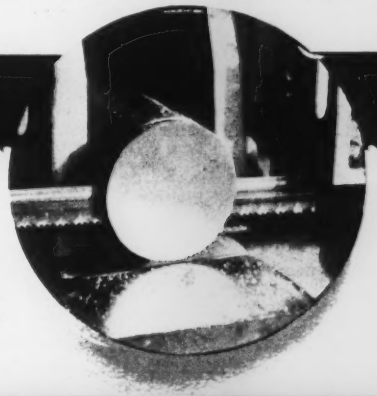


. . . for Contour Cutting

Made of tough, alloy steel that resists breaking, yet holds a keen cutting edge, Simonds Standard-Tooth Hard-Edge Band Saws in the narrower widths are outstanding favorites for contour work. That's why you'll find them so widely used in die-making and contour sawing of all kinds. Perfectly formed teeth, set with absolute evenness on both sides of the blade, insure smooth, accurate results and greater satisfaction



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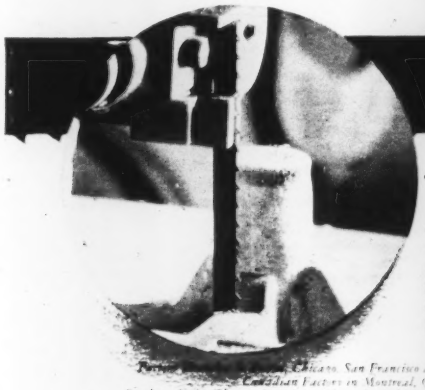
In the wider widths, these rugged, long-lasting Hard-Edge Blades are "tops" for use on horizontal machines, cutting off bars, tubing, angle iron, etc. Furnished either Regular Set or Wavy Set to handle the variety of cutting encountered in steel warehouses and general shop work. Hardy new 100' and approximately 300' coil containers insure factory perfect saw blades. Welded-to-length saws also supplied.



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Simonds Hard-Edge Skip-Tooth Band Saws are especially adapted for use on soft materials such as aluminum, magnesium, plastics, and hardwoods ...provide extra gullet capacity with maximum blade strength... are widely used in brass and aluminum foundries and plastic fabricating plants. Your Simonds Distributor will supply you with the right blade for your job.

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ELECTROMET Data Sheet

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ALLOYS FOR THE STEEL, IRON, AND NON-FERROUS INDUSTRIES

PRODUCT*	NOMINAL COMPOSITION	USES
BORON ALLOYS		
Ferroboron		
Min. 10.00% Boron Grade	Silicon.....max. 1.50% Aluminum.....max. 0.50% Carbon.....max. 1.50%	Increases hardenability of steel; also, for additions to malleable iron and aluminum alloys.
Min. 17.50% Boron Grade	Silicon.....max. 1.50% Aluminum.....max. 0.50% Carbon.....max. 0.50%	
Manganese-Boron	Boron.....min. 17.50% Manganese...approx. 75% Silicon.....max. 1.50% Carbon.....max. 3% Iron.....max. 5%	Used to cleanse and deoxidize non-ferrous alloys.
Nickel-Boron	Boron.....15 to 18% Silicon.....max. 1.50% Aluminum.....max. 1.00% Carbon.....max. 0.50% Iron.....max. 3.00% Nickel.....Balance	Special boron alloy used principally for deoxidizing nickel and its alloys.
Boron Carbide	Boron.....45 to 50% Carbon.....45 to 50%	Deoxidizer for non-ferrous alloys.
Calcium Boride	Boron.....38 to 42% Calcium.....27 to 32% Carbon.....15 to 20%	Welding rod coating.
CALCIUM ALLOYS		
Calcium-Silicon	Calcium.....30 to 33% Silicon.....60 to 65% Iron.....1.50 to 3%	Deoxidizer for quality ingot steel. Also used in high-tensile gray irons.
Calcium-Manganese-Silicon	Calcium.....16 to 20% Manganese.....14 to 18% Silicon.....53 to 59%	A complex deoxidizer used widely in production of steel castings.
Calcium Metal		
Regular Grade	Calcium.....98% (Cylinders, Slabs, Cut Pieces, or Turnings)	Reducing agent in metallurgical applications, deoxidizer and degasifier for non-ferrous metals, particularly magnesium.
Distilled Grade	Calcium...approx. 99.90% (Irregular pieces from pea size to 14 in. lumps)	For special applications requiring calcium of very high purity.
CHROMIUM ALLOYS		
Low-Carbon Ferrochrome	Chromium.....67 to 71% Silicon.....0.30 to 1.00% Carbon (10 Grades) max. 0.03 to max. 2.00%	Production of stainless steels and high-temperature alloys requiring low carbon content.
High-Carbon Ferrochrome		
Max. 4.50, 5.00, or 6.00% Carbon Grade	Chromium.....67 to 70% Silicon.....1 to 2%	For production of engineering alloy steels and other alloy steels of moderate chromium content.
Max. 7.00% Carbon Grade	Chromium.....66 to 69% Silicon.....1 to 3%	
Min. 7.00% Carbon Grade	Chromium.....65 to 68% Silicon.....1 to 3%	
Nitrogen-Bearing Low-Carbon Ferrochrome	Chromium.....67 to 71% Silicon.....0.30 to 1.00% Carbon.....max. 0.10% Nitrogen....approx. 0.75%	For additions of nitrogen to improve properties of high-chromium steels.
"SM" Ferrochrome	Chromium.....60 to 65% Silicon.....4 to 6% Carbon.....4 to 6% Manganese.....4 to 6%	A high-solubility chromium addition for steel or iron in either furnace or ladle.
Exothermic Ferrochrome	Chromium...60% approx. Carbon.....4.5% max.	An improved exothermic ladle alloy with high solubility, low carbon pickup, and high ignition temperature.
Exothermic Silicon-Chrome	Chromium...40% approx. Silicon.....23% approx. Carbon.....1.00% max.	An improved exothermic ladle alloy with high solubility, very low carbon pickup, and high ignition temperature.

PRODUCT*	NOMINAL COMPOSITION	USES
CHROMIUM ALLOYS cont.		
Foundry Ferrochrome		
High-Carbon Grade	Chromium.....62 to 66% Silicon.....7 to 10% Carbon.....5 to 7%	Developed especially for high-solubility ladle additions of chromium to improve composition and properties of cast iron.
Low-Carbon Grade	Chromium.....50 to 54% Silicon.....28 to 32% Carbon.....max. 1.25%	
Chromium Metal	Chromium.....min. 97%	
Low-Carbon Grades	Carbon.....max. 0.10% and 0.50% Iron.....max. 1%	Production of wide variety of non-ferrous chromium-bearing alloys, including electrical resistance alloys and high-temperature alloys.
High-Carbon Grade	Chromium.....87 to 90% Carbon.....9 to 11% Iron.....max. 1.25%	
"EM" Ferrochrome-Silicon		
No. 1 Grade	Chromium.....39 to 41% Silicon.....42 to 46% Carbon.....max. 0.05%	In production of stainless steels, these alloys are used to reduce metal oxides from the slag back into bath.
No. 2 Grade	Chromium.....36 to 39% Silicon.....36 to 39% Carbon.....max. 0.05% Aluminum.....7 to 9%	
"EM" Ferrosilicon-Chrome	Chromium.....50 to 54% Silicon.....28 to 32% Carbon.....max. 1.25%	For adding chromium and silicon to steels containing up to 1 or 2 per cent chromium.
"EM" Chromium Briquets (Hexagonal Shape)	Chromium.....2 lb. Total Weight.....3½ lb.	For adding chromium to cast iron in the cupola.
COLUMBIUM ALLOYS		
Ferrocolumbium	Columbium.....50 to 60% Silicon.....max. 8% Carbon.....max. 0.40%	Stabilizer in austenitic chromium-nickel stainless steels. Also constituent of high-temperature alloys.
Ferrotantalum-Columbium	Columbium...approx. 40% Tantalum.....approx. 20% Cb + Ta.....min. 60% Silicon.....4 to 6% Carbon.....max. 0.30%	Another stabilizer, used to supplement ferrocolumbium, in austenitic chromium-nickel stainless steels. Also used in high-temperature alloys.
MANGANESE ALLOYS		
Standard Ferromanganese		
Regular Grade Low-Phosphorus Grade	Manganese.....78 to 82% Carbon.....approx. 7% Silicon.....max. 1% Manganese.....78 to 82% Carbon.....max. 7% Silicon.....max. 2% Phosphorus...max. 0.10%	Most common means of adding manganese to steel for both alloying and deoxidizing purposes. Also for counteracting sulphur in steel and cast iron.
Low-Carbon Ferromanganese	Manganese.....min. 90%	
Low-Phosphorus Grade	Carbon.....max. 0.07% Phosphorus...max. 0.06%	Additions of manganese to steels of low-carbon specification, particularly stainless steels of 18 per cent chromium, 8 per cent nickel type.
Regular Grades	Manganese.....85 to 90% Carbon....max. 0.07, 0.11 to 0.15, 0.30, or 0.50%	
Regular Grade (High-Silicon)	Manganese.....80 to 85% Carbon.....max. 0.75% Silicon.....5 to 7%	
Medium-Carbon Ferromanganese	Manganese.....80 to 85% Carbon.....max. 1.25 to 1.50%	For making low- and medium-carbon manganese steel and Hadfield steel.
Silicomanganese		
Max. 1.50% Carbon Grade	Manganese.....65 to 68% Silicon.....18 to 20%	A versatile alloy useful as furnace block, deoxidizer, and also for making manganese additions to steel in the ladle or in the furnace.
Max. 2.00% Carbon Grade	Manganese.....65 to 68% Silicon.....15 to 17.50%	
Max. 3.00% Carbon Grade	Manganese.....65 to 68% Silicon.....12 to 14.50%	

*All of the alloys and metals listed are produced in the usual lump, crushed, or ground sizes, except where other special forms are indicated.

PRODUCT *	NOMINAL COMPOSITION	USES
MANGANESE ALLOYS cont.		
Low-Iron Ferromanganese	Manganese....85 to 92% Carbon....approx. 7.00% Silicon....max. 3% Iron....max. 2%	For high manganese additions to certain non-ferrous alloys, particularly aluminum.
Manganese Metal	Manganese....min. 96% Carbon....max. 0.20% Silicon....max. 1.00% Iron....max. 2.50%	Used both as deoxidizer and alloy in production of numerous non-ferrous metals and alloys.
"EM" Silico-manganese Briquets (Square Shape)	Manganese....2 lb. Silicon....½ lb. Total Weight....3½ lb.	For adding manganese (with silicon) to cast iron in the cupola.
"EM" Ferro-manganese Briquets (Oblong Shape)	Manganese....2 lb. Total Weight....3 lb.	For adding manganese (without silicon) to cast iron in the cupola.
SILICON ALLOYS		
50% Ferrosilicon		
Regular Grade	Silicon....47 to 51%	Deoxidizer for most grades of killed or semi-killed steel. Blocking grade specially sized for maximum efficiency.
Blocking Grade	Silicon....47 to 51%	
Low-Aluminum Grade	Silicon....47 to 51% Aluminum....max. 0.40%	
65% Ferrosilicon		
Regular Grade	Silicon....65 to 70%	For furnace or ladle addition to carbon and alloy steels.
Low-Aluminum Grade	Silicon....61.50 to 66.50% Aluminum....max. 0.50%	Mainly for production of electrical sheet steel.
75% Ferrosilicon		
Regular Grade	Silicon....73 to 78%	Deoxidizer and alloy for production of high-silicon spring and electrical sheet steel. Graphitizing inoculant for cast iron.
Low-Aluminum Grade	Silicon....73 to 78% Aluminum....max. 0.50%	
85% Ferrosilicon		
Regular Grade	Silicon....83 to 88%	Enables melter to add higher percentages of silicon without chilling metal in ladle. Graphitizing inoculant for cast iron.
Low-Aluminum Grade	Silicon....83 to 88% Aluminum....max. 0.50%	
90% Ferrosilicon		
Regular Grade	Silicon....92 to 95%	Permits large additions of silicon without harmful chilling effect.
Low-Aluminum Grade	Silicon....92 to 95% Aluminum....max. 0.50%	
Silicon Metal		
Regular Grade	Silicon....min. 97 or 96% Iron....max. 1 or 2%	Additions of silicon to non-ferrous metals, particularly aluminum and copper, to improve physical properties.
Purified Grade	Silicon....99.70 to 99.90% Iron....005 to .015%	For applications in non-ferrous industry requiring silicon of high purity.
Low-Calcium Grade	Silicon....min. 97% Iron....max. 1% Calcium....max. 0.10%	For the production of high-silicon aluminum alloys where calcium is detrimental.
Low-Aluminum Grade	Silicon....min. 98% Iron....max. 1% Aluminum....max. 0.10%	For the production of silicon-copper alloys where aluminum is detrimental.
"SMZ" Alloy	Silicon....60 to 65% Manganese....5 to 7% Zirconium....5 to 7%	Particularly strong graphitizing inoculant used in making ladle additions to cast iron.
Special Graphitizer	Ferrosilicon Compound	Deoxidizer and graphitizer for cast iron.
Magnesium-Ferrosilicon	Silicon....approx. 45% Magnesium..approx. 8.5%	For ladle addition to cast iron to obtain special properties.
Barium-Silicon	Barium....40 to 50% Silicon....45 to 55%	For deoxidation of non-ferrous alloys.
"EM" Silicon Briquets (Cylindrical Shape)		
Large Size	Silicon....2 lb. Total Weight....5 lb.	For adding silicon to cast iron in the cupola.
Small Size	Silicon....1 lb. Total Weight....2½ lb.	

"Electromet," "EM," "SM," and "SMZ" are trade-marks of Union Carbide and Carbon Corporation.

PRODUCT *	NOMINAL COMPOSITION	USES
TITANIUM ALLOYS		
Ferrotitanium	Titanium....27 to 35% Carbon....max. 0.10%	For stabilized austenitic stainless steels and high-temperature metals.
Silicon-Titanium	Titanium....40 to 50% Silicon....45 to 50% Iron....max. 3%	For additions of titanium to steels or non-ferrous alloys.
Manganese-Nickel-Titanium	Titanium....43 to 48% Nickel....approx. 25% Manganese....max. 8%	Deoxidization of nickel alloys.
TUNGSTEN ALLOYS		
Ferrotungsten	Conforming to A.S.T.M. Spec. A 144-39	For production of tool and die steels, also high-temperature alloys.
Tungsten Metal Powder		Production of tungsten steels and cast tungsten carbide.
Melting Grade	Tungsten....min. 98.80% Total Carbon..max. 0.25%	
Calcium Tungstate	Tungstic Oxide..68 to 72%	For making tungsten chemicals and other tungsten products.
Calcium Tungstate Nuggets	Tungstic Oxide..68 to 72%	Making tool steels and high-temperature alloys by direct reduction.
Ammonium Paratungstate	Tungstic Oxide..min. 88.7%	Intermediate for tungsten products.
VANADIUM ALLOYS		
Ferrovanadium	Vanadium....50 to 55% Carbon....max. 0.20, 0.50, or 3.00% Silicon....max. 1.50, 2.00, or 8%	Production of tool and engineering steels, high-strength structural steels, non-aging rimming steels, and wear-resistant irons.
Vanadium Oxide Fused	V_2O_5....86 to 89% Na_2O....approx. 10% CaO....approx. 2%	For addition of vanadium to steel and for manufacturing catalysts.
Sodium Polyvanadate (Red Cake)	V_2O_5....approx. 85% Na_2O....approx. 9% CaO....approx. 2% H_2O....approx. 2.5%	For manufacture of vanadium compounds, including vanadium catalysts.
High-Purity Ammonium Metavanadate	V_2O_5....approx. 99.50% NH_4VO_3....min. 99%	
ZIRCONIUM ALLOYS		
12 to 15% Zirconium Alloy	Zirconium....12 to 15% Silicon....39 to 43% Carbon....max. 0.20%	This is a powerful deoxidizer. It also increases depth of hardening.
35 to 40% Zirconium Alloy	Zirconium....35 to 40% Silicon....47 to 52% Carbon....max. 0.50%	Deoxidizer for fine grades of alloy steels. Used for adding larger amounts of zirconium.
Nickel-Zirconium	Zirconium....25 to 30% Nickel....40 to 50%	For deoxidizing and degasifying nickel alloys.

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More than 50 different alloys and metals are produced by ELECTROMET in hundreds of varying compositions and sizes. If you need help in selecting the proper alloys, or have some specific metallurgical problem, be sure to consult one of ELECTROMET'S specially trained metallurgists and engineers. Address your inquiries to one of the offices listed below.

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Acid Fluoboric	•	•	•				•	•	•	•	•	•	•			•					
Acid Hydrofluoric, Reagent		•	•				•			•	•										
Alkali Fluoborates							•	•		•	•										
Aluminum Chloride, Solution		•	•			•	•		•	•	•	•	•	•			•	•	•	•	•
Aluminum Fluoride, Crystal		•								•		•		•							
Aluminum Nitrate		•	•									•								•	
Ammonium Acetate						•				•		•		•				•		•	
Ammonium Oxalate			•		•				•	•			•	•			•	•		•	
Ammonium Sulfate Purified and Reagent A.C.S.	•	•				•	•		•	•				•		•	•			•	
Ammonium Thiosulfate				•					•	•				•	•					•	
Boron Trifluoride Gas and Various Complexes		•								•	•	•	•	•		•		•		•	
Cadmium Nitrate	•	•		•			•					•	•			•					
Calcium Acetate Purified and Reagent		•				•							•	•		•		•	•		
Calcium Chloride, Anhydrous Purified and Reagent A.C.S.				•		•										•					
Calcium Phosphide					•						•										
Chlorine Trifluoride		•														•					
Chromium Fluoride		•	•							•			•							•	
Chromium Nitrate		•														•					
Chromium Potassium Sulfate (Chrome Alum)		•	•						•					•	•		•			•	
Cupric Nitrate		•	•		•			•		•					•					•	
Cuprous Chloride	•	•	•		•					•	•	•	•	•		•				•	
Ferric Nitrate			•						•											•	
Ferrous Ammonium Sulfate		•	•						•								•				
Lead Nitrate		•	•		•				•		•	•	•	•	•		•		•	•	
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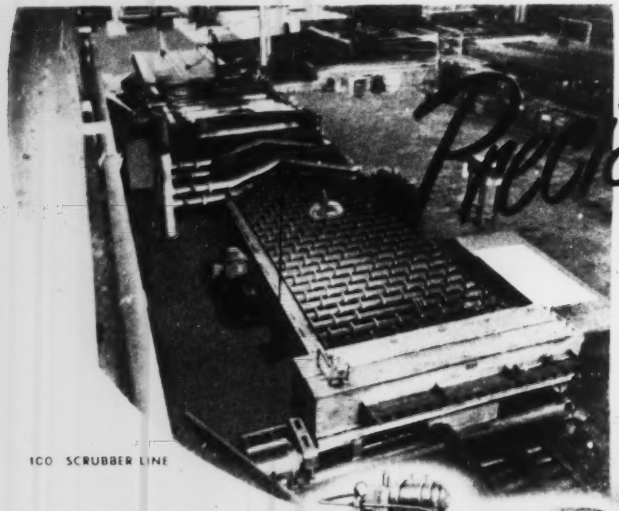

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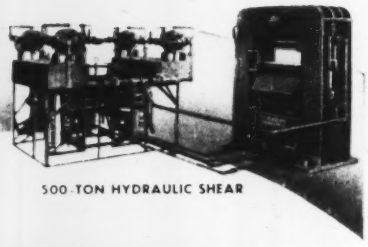

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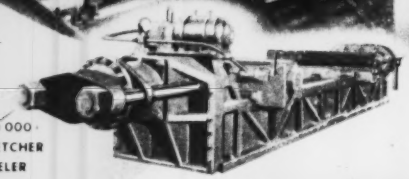

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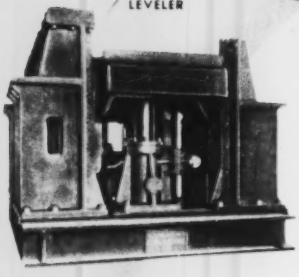

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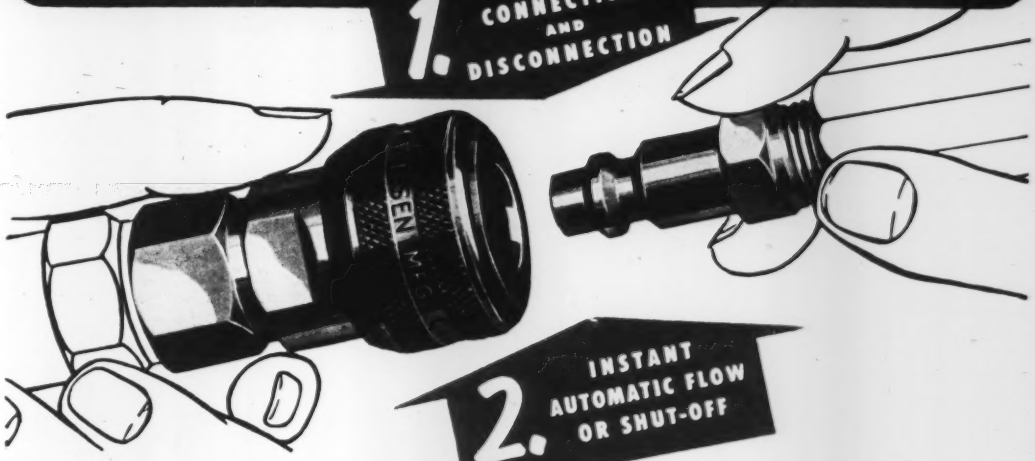

2. INSTANT AUTOMATIC FLOW OR SHUT-OFF

With Hansen couplings you save precious minutes every time you connect or disconnect a fluid line carrying gas, liquid or grease.

To connect, you merely push plug into socket—flow starts instantly. To disconnect, pull back sleeve on socket, coupling disconnects. Flow is shut off instantly and automatically.

From a wide range of available sizes and types, you can select a Hansen coupling exactly suitable for your application—each type engineered to meet its specific requirements.

WRITE FOR CATALOG

QUICK-CONNECTIVE COUPLINGS for AIR
ACETYLENE • OIL • GREASES • GASES
VACUUM • STEAM • OXYGEN • HYDRAULIC

REPRESENTATIVES

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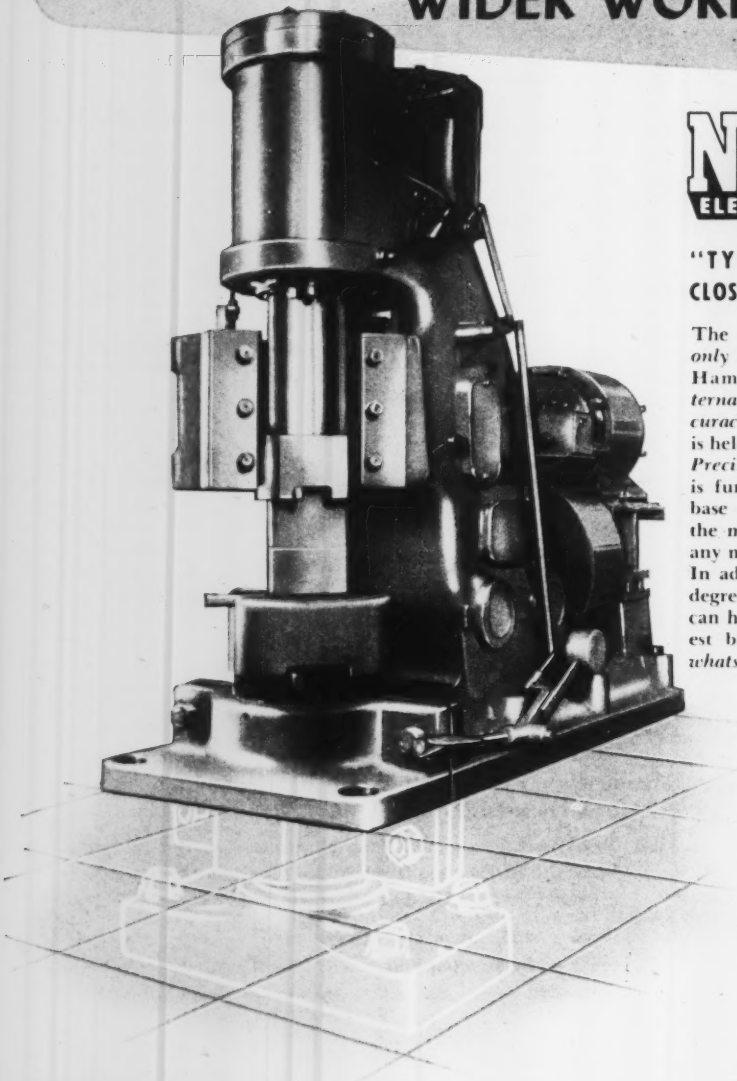
QUICK CONNECTIVE FLUID LINE COUPLINGS . . .

THE HANSEN MANUFACTURING COMPANY

4031 WEST 150th STREET • CLEVELAND 11, OHIO

Extreme Accuracy—

WIDER WORK RANGE



NAZEL
ELECTRO-PNEUMATIC

"TYPE I" HAMMER FOR CLOSED or OPEN DIE WORK

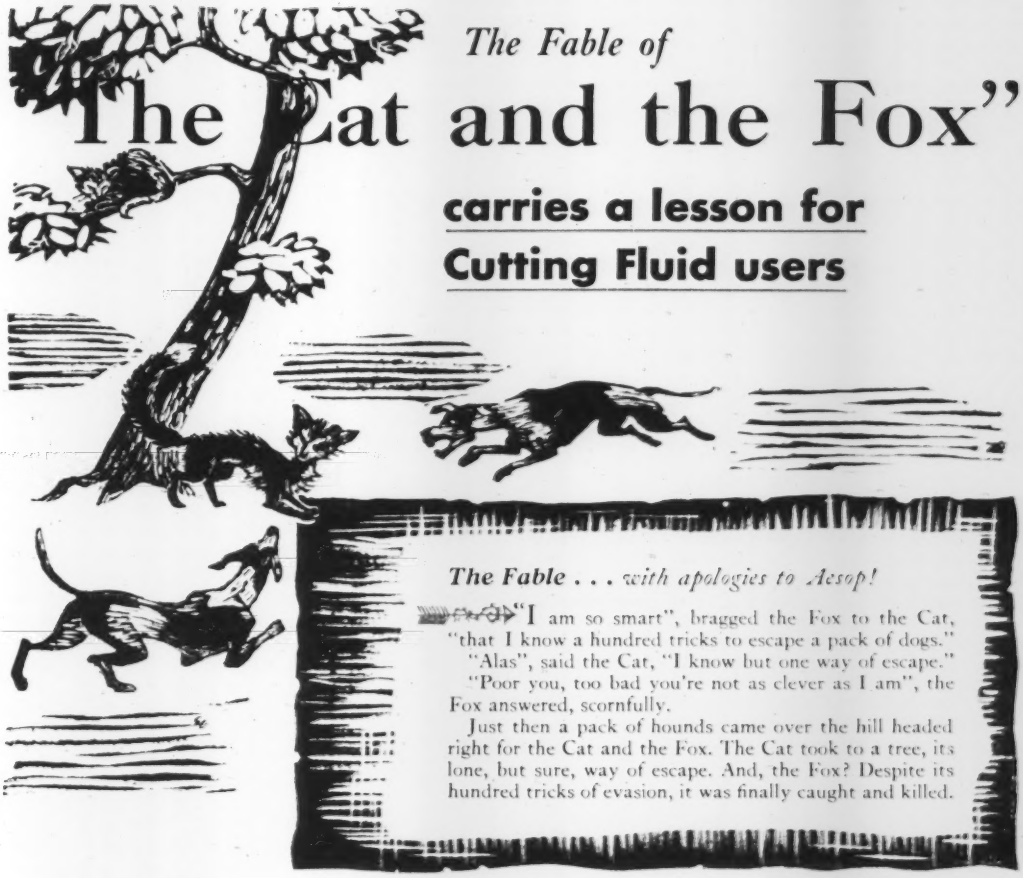
The NAZEL "Type I" is the *only* Electro-Pneumatic Forging Hammer with adjustable *external guides . . . increased accuracy* is assured since the ram is held tight within these guides. *Precise alignment at all times* is further assured, because the base is machined to *exactly fit* the machined anvil, preventing any movement of the lower die. In addition, due to the minute degree of control, the NAZEL can hit the hardest or the lightest blow *with no adjustments whatsoever.*

FREE—Write for your copy of our helpful Forging Hammers Bulletin, today!

1836

LOBDELL UNITED COMPANY
WILMINGTON 99, DELAWARE
A SUBSIDIARY OF UNITED ENGINEERING AND FOUNDRY COMPANY

1952



The Fable of

The Cat and the Fox"

carries a lesson for Cutting Fluid users

The Fable . . . with apologies to Aesop!

"I am so smart", bragged the Fox to the Cat, "that I know a hundred tricks to escape a pack of dogs."

"Alas", said the Cat, "I know but one way of escape."

"Poor you, too bad you're not as clever as I am", the Fox answered, scornfully.

Just then a pack of hounds came over the hill headed right for the Cat and the Fox. The Cat took to a tree, its lone, but sure, way of escape. And, the Fox? Despite its hundred tricks of evasion, it was finally caught and killed.

The Lesson . . . .

Like the Cat in Aesop's fable, a cutting fluid that best meets a given set of conditions will prove most successful in the long run. A cutting fluid designed to do a hundred jobs may not be the best answer to any. By recommending the cutting fluids best qualified to meet *your* requirements, D. A. Stuart Oil Co. saves you time, money and materials, gives you the optimum relationship between finish, tool life and output on every machining job.

More Than a "Coolant" is Needed

D. A. Stuart Oil Co.
EST. 1865 LIMITED

TIME-TESTED CUTTING FLUIDS AND LUBRICANTS

2735-37 S. Troy St., Chicago 23, Ill.

FILL IN COUPON — CLIP TO YOUR LETTERHEAD

and mail to D. A. Stuart Oil Co. Ltd.
2735-37 S. Troy St., Chicago 23, Ill.
for your copy of "*More Than a Coolant is Needed*"

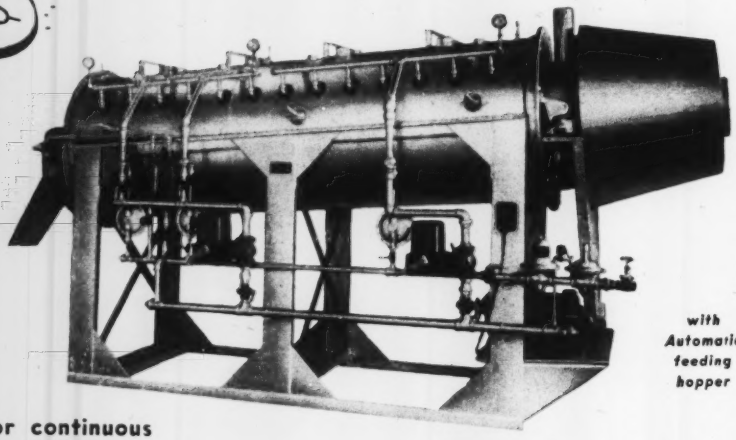
Name .....

Title .....

There's money in the AGF Rotary Retort Furnace

Model No. 139M Continuous Hardening Type.

Used for annealing coin blanks in the U. S. MINT



with Automatic feeding hopper

Widely used for continuous uniform heat treatment of—
lock washers, balls, cups, ball bearing washers, roller bearings, cones, small tools, coin blanks, screw machine and instrument parts, forgings, stampings, etc.

SPECIAL USES—

These furnaces also find application in the process industries for treating pigments, calcining and burning operations such as the burning of garnet grain and the burning of old grain to remove the glue from it. For this work, the furnace is usually supplied with a spiralless retort.

CAPACITIES—

Model No. 29— 75 to 100 lbs. of steel per hr.
Model No. 136—150 to 300 lbs. of steel per hr.
Model No. 65—300 to 500 lbs. of steel per hr.
Model No. 139—500 to 1000 lbs. of steel per hr.

CONSTRUCTION—

The construction is modern throughout, consisting of a welded steel plate casing with a lining of insulating refractory backed by block insulation. Heat resisting alloy burners and super refractory burner tunnels are employed to give long and trouble-free service.

For controlled atmosphere work. Continuous Rotary Retort Furnaces are provided with positive seal retorts and hopper closures.

These furnaces may be used in series for multiple purposes and in conjunction with cooling machines and quench tanks for a variety of purposes.

Ask AGF PIONEERS
to recommend the proper furnaces for your production

AMERICAN GAS FURNACE CO.
996 LAFAYETTE STREET, ELIZABETH 4, N. J.

Write for Bulletin Nos. 801, 802 and 803.

photograph by d'Arazien

Carbon content "to order"!

CHEMISTS at J&L use this high-temperature electric furnace in making sure that each heat of steel contains the amount of carbon specified on the customer's order.

Carbon is the principal element that makes steel different from iron, and is the chief hardening and strengthening element in the metal. More carbon (up to 1 per cent) forms hard steels. Less carbon (as little as .05 per cent) makes steel soft and workable.

Samples analyzed in this laboratory are taken from molten steel in the furnace, from the ladle while the steel is being poured into ingot molds, and from billets and bars after the steel is rolled. The samples are cooled and rushed to the laboratory through pneumatic tubes.

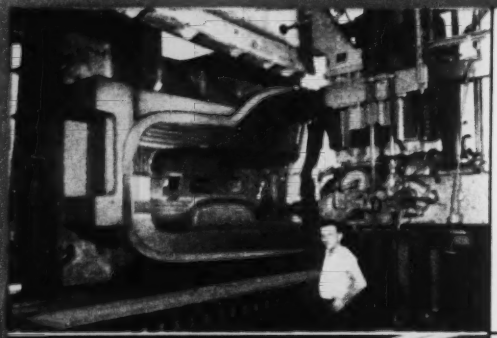
Drillings from the steel samples are weighed and placed in the oxygen atmosphere inside the small electric furnace where the temperature is 2100 degrees F. Oxygen is passed through the combustion tube and combines with the carbon as it burns out of the steel, forming the gas CO_2 (carbon dioxide). The CO_2 is discharged into a pre-weighed absorption bulb. Change in weight of the absorption bulb is measured on the precision balance at the right, enabling the chemist to determine the percentage of carbon that was in the steel sample.

Steel with carbon (and the other important elements) "to order" for a specific application—that's the way your order is handled at J&L.

The never-ending, round-the-clock vigilance in Jones & Laughlin Steel Corporation laboratories is one of the many activities going on behind the J&L trademark to make better steel for your every use.

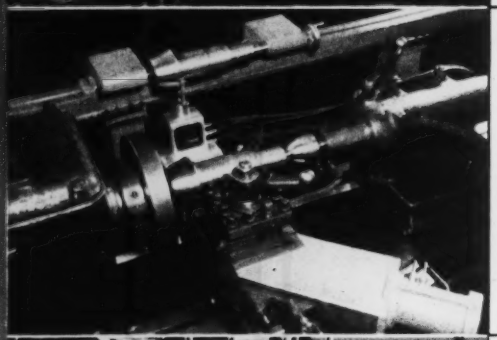
JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.

Bring your standard machines up-to-date with Turchan HYDRAULIC DUPLICATORS



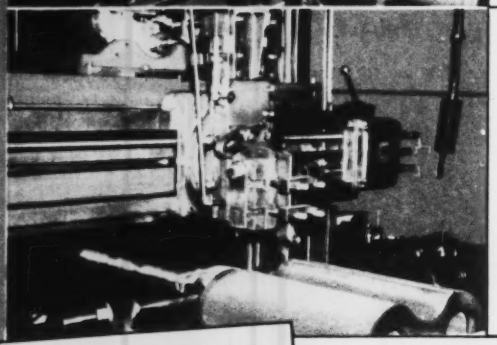
MILLING...

The Turchan Follower attachment will transform those difficult tasks to simple push-button operation on your standard horizontal or vertical millers. Irregular profiles and contours; machining of dies, forms and moulds are achieved automatically. Hydraulically controlled cutting tools reproduce directly in metal, the exact dimensions of the model or template. No costly form tools or skilled help necessary. Close accuracies and extremely fine surface finish are cost-cutting features that save rejects. Turchan users report savings of 80% to 600% over old methods.



TURNING...

Thousands of lathes in shops all over America, are increasing efficiency and speeding production with Turchan duplicators. The single attachment is pictured machining a stepped shaft. The Turchan replaces the regular cross slide; operates at 45° angle, taking uninterrupted cuts over the work. Square or tapered shoulders, radii, grooves, bevels and undercuts, as well as facing, are all taken in stride to accuracies of .001". There is also a Turchan *dual 45°* lathe attachment which actually doubles tool approach to the work. Any size or make of conventional lathe can be Turchan equipped.



PLANING...

Standard planers equipped with the Turchan will duplicate irregular shapes, such as this blower section as readily as straight work. Contours are obtained automatically, with precision results. After job set-up, which is greatly simplified with the Turchan, little more than loading and unloading the work need be done. Once again skilled help is not required, yet production multiplies rapidly. Turchan Followers are also available for ordinary shapers and grinders. The attachment in no way interferes with the conventional controls of the machine tool. "Turn to Turchan to cut cost."

Write for New Catalog!

Tells how to get more and better work from your present machines, without skilled help and special tools.

GET AN ESTIMATE: Send a sketch and specifications of any job. Give make of machine. We'll show you how to produce it better, faster, at lower cost.

Turchan FOLLOWER MACHINE COMPANY
8259 LIVERNOIS AVENUE DETROIT 4, MICH.

Morse ...leading producer of precision-built chain drives

MORSE SILENT CHAIN DRIVES

Industrial type: Morse Industrial Silent Chain Drives are quiet, smooth-running, reliable. They give long years of efficient service with fewer service interruptions.

Automotive type: Morse Automotive Silent Chain Drives are precision-made, mass-produced. The experience and production facilities necessary to supply thousands of these drives daily enable Morse to supply highest-quality, economical industrial drives.

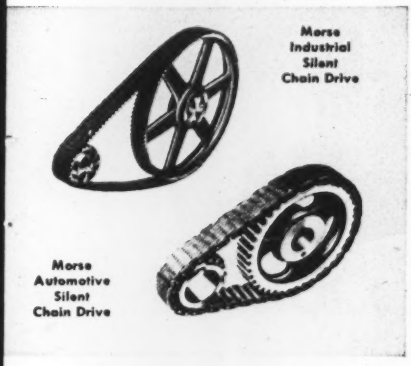
MORSE STANDARD ROLLER CHAIN DRIVES

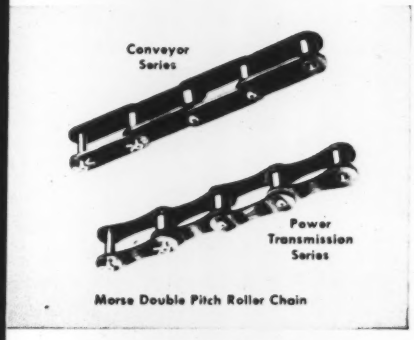
Morse Standard Roller Chain Drives are 99% efficient. They use teeth, not tension; won't slip.

Morse Standard Roller Chains are available from distributors' stock from $\frac{1}{4}$" pitch to $2\frac{1}{2}$" pitch, with horsepower capacities ranging from less than 1/10 H.P. to extremely heavy horsepower applications using large-pitch, multiple-strand chains. Corresponding sprockets available in types A, B, and C.

MORSE HY-VO DRIVES

Sensational, proved Morse Hy-Vo Drives transmit more horsepower at higher speeds and lower cost than any other standard power transmission drives. They cut operating costs per hour up to 50%, operate 45% more quietly, give up to one-third longer service life. Morse Hy-Vo opens the way to transmitting far more horsepower from smaller, faster engines —without costly outboard bearings and mounts.





MORSE DOUBLE-PITCH ROLLER CHAINS

Morse Double-Pitch Roller Chains give positive drive. They cost less, weigh less, and give long life comparable to that of standard roller chains. Single and double-duty sprockets available.

MORSE CABLE CHAINS

Precision-built for heavy-duty service. Standard pitches from $\frac{1}{2}$" to 1", with average ultimate breaking strength of from 3900 pounds to 49,000 pounds.

For information on any of these precision-built power transmission chains or chain drives, write Morse direct or phone your Morse distributor.

MORSE CHAIN COMPANY
Dept. 388, 7601 Central Ave. • Detroit 10, Michigan

Morse *means* Power Transmission

MORSE
MECHANICAL *POWER TRANSMISSION* PRODUCTS
BW

Let this booklet show you the way to

INCREASED PRODUCTION EFFICIENCY THROUGH INDUCTION HEATING

Westinghouse has prepared a Case History Booklet showing a few of the Induction Heating applications presently being used by some of America's largest manufacturers. It's one amazing record after another of what Induction Heating can do . . . backed up by product, production and cost comparison figures. Some cases may remind you of situations in your plant. Others may suggest application possibilities not yet tried. But all the stories will give you a good idea of the ever-increasing scope of Induction Heating.

Already, thousands of different parts are being hardened, annealed or joined by Induction Heating. But there are thousands more that could be . . . and should be heat treated by this method. *Because invariably every case where Induction Heating has been put to work, the user has gotten increased production efficiency . . . at lower operating cost!* But see for yourself what this outstanding tool can do. Just clip the coupon for your free copy of this informative booklet — or drop us a line with your request to Westinghouse Electric Corporation, Dept. S-38, 2519 Wilkens Avenue, Baltimore 3, Maryland.

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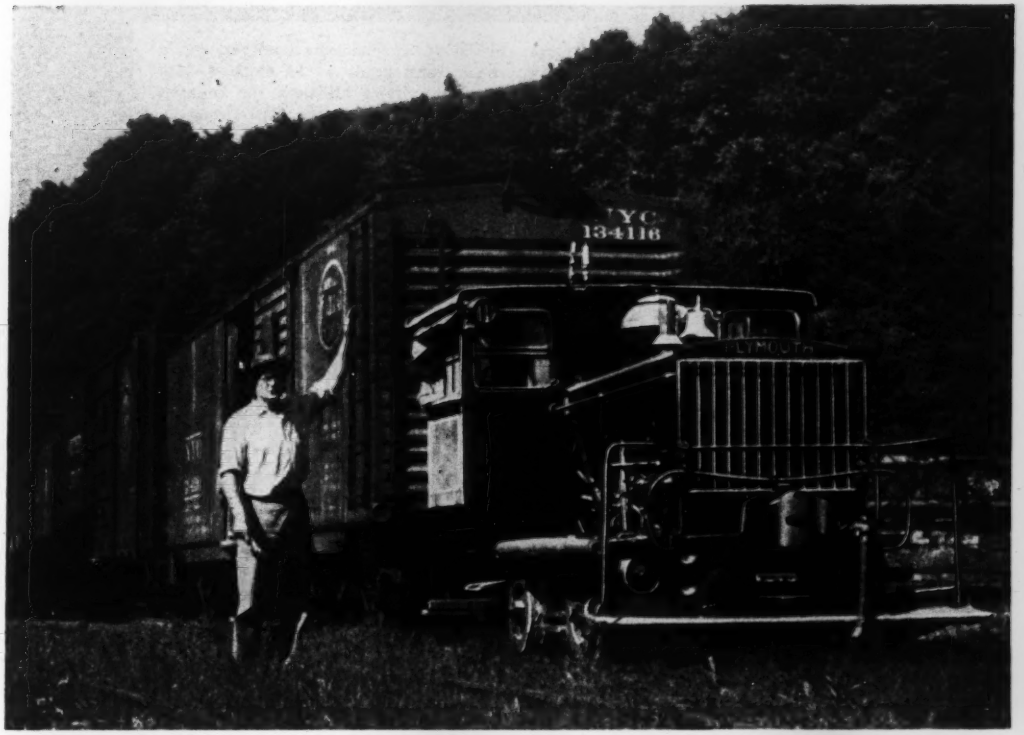
YOU CAN BE SURE... IF IT'S

Westinghouse

INDUCTION HEATING



Reduces Switching Time

"For 19 years our Plymouth Model JLC, 14-ton switcher has been saving switching time and improving all around efficiency," reports an executive of one of the nation's large chemical firms.

This dependable Plymouth is on the job 66 hours a week, handles over 142 cars per week and requires only routine maintenance. It has won favor with the operator too, who says, "The Plymouth is easy to handle. I like it."

Improved over-all efficiency—reduced switching time—dependable, low-cost performance—easy, man-saving operation—all are reasons why you should join the many other companies who rely on Plymouth for dependable, economical hauling.

Narrow or standard gauge Plymouth Locomotives are available in 3-ton to 70-ton sizes . . . gasoline or Diesel-mechanical, Diesel-electric, and gasoline or Diesel-hydraulic drive. Send an outline of your hauling needs. Our engineers will be glad to assist you. Write for catalog today. PLYMOUTH LOCOMOTIVE WORKS, Division of the Fate-Root-Heath Company, Dept. A-1, Plymouth, Ohio

PLYMOUTH LOCOMOTIVES

ALSO MANUFACTURERS OF F-R-H CERAMIC MACHINERY

There's plenty of reserve capacity, more than enough for all your needs. And take a look at the acid and alkali resistant coating on these oversize transformers and selenium stacks—that's real assurance of dependable long life. But that isn't all. Those connections from the transformers to the selenium rectifiers are so flexible that floor vibrations can't possibly loosen the cell connectors. And for ventilating, the chimney effect produced by drawing clean cool air through the cabinet cuts the danger of overheating. These advantages are built into every H-VW-M rectifier—the ones you see in these crates ready to be shipped—and those in service all over the country. They're built to last for *years*.

Durable, dependable rectifiers are only one of the many results of H-VW-M's constant progress in electroplating development for more than eighty years. It's a continuous policy, best summed up in H-VW-M Platemanship . . . your working guarantee of the best that industry has to offer—not only in rectifiers—but in every phase of plating and polishing.

8529

PLATEMANSHIP

PLATEMANSHIP

this oversize rectifier transformer is typical of H·VW·M "extras"

Your H·VW·M combination of the most modern testing and development laboratory of over 80 years experience in every phase of plating and polishing of a complete equipment, process and supply line for every need

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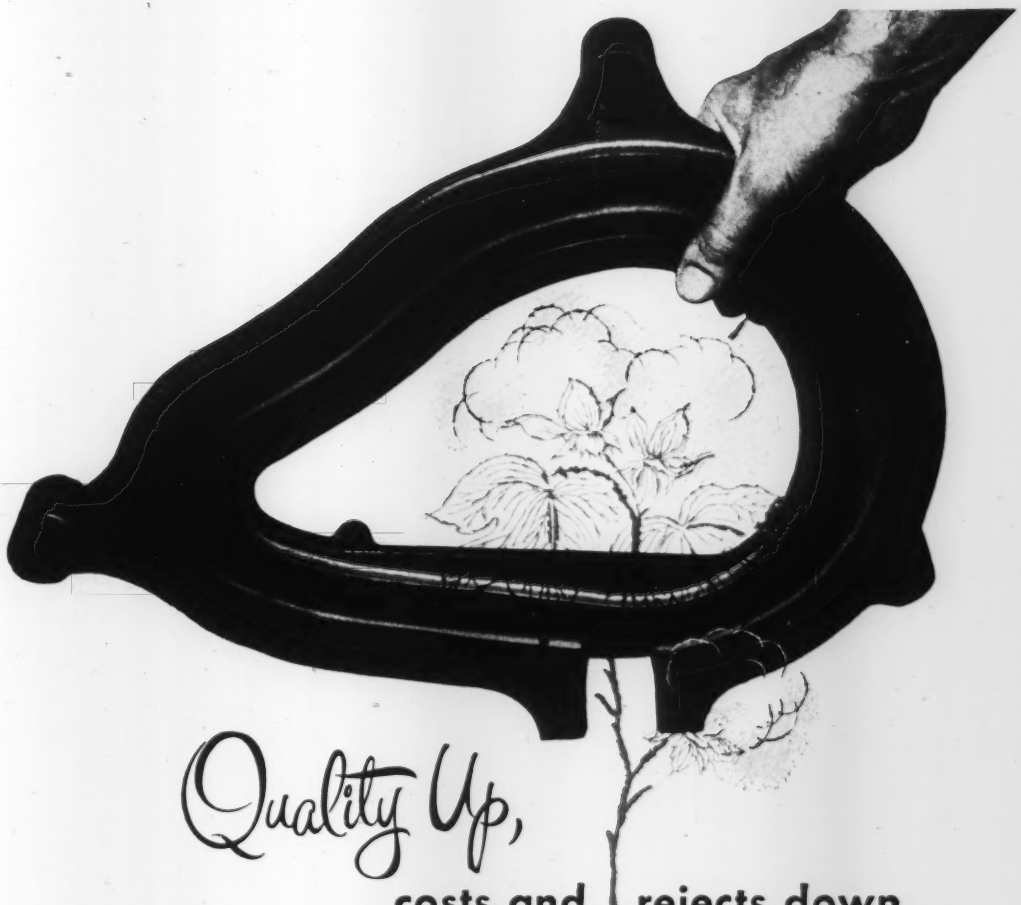
INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES



Quality Up,

costs and rejects down
WITH CRUCIBLE TOOL STEEL CASTINGS

The steel part shown above used to be a production headache. A cam for a cotton picking machine, it was originally flame cut from SAE 8730 boiler plate, machined and heat treated. Other difficult steps included end-milling and finish-grinding the cam track. Rejections were high, because the cam often warped during heat treatment.

The problem was solved by casting the cam in Airkool®, a Crucible air-hardening tool steel. When the customer receives the casting from Crucible, all he has to do is finish it, mill the cam track and heat treat. He doesn't have to finish grind – Airkool is non-deforming when properly hardened and tempered. Machining costs are way down and quality is up, since Airkool resists wear far better than the low alloy steel from which the part used to be made.

Crucible's casting facilities often make it possible to use wear- and abrasion-resisting tool steel for complicated machine parts. We may be able to help you just as we helped the cotton picking machine manufacturer. Get in touch with Crucible today!

CRUCIBLE

52 years of Fine steelmaking

first name in special purpose steels

SAND CASTINGS

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

REX HIGH SPEED • TOOL • REZISTAL STAINLESS • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS

55 PAGES OF FACTS ON HOW TO CUT YOUR SMALL PARTS FINISHING COSTS

Now you can get up-to-the-minute news on the very latest developments in barrel-finishing — the fast, modern, economical process that deburrs, removes scale, tool marks and flash, and produces surface finishes and radii to blueprint specifications.

Norton Company's brand new booklet covers the subject thoroughly in 55 liberally illustrated, fact-filled pages — describes in detail every phase of barrel-finishing — tells you what to do, *and what not to do*, for best results.

PARTIAL LIST OF SUBJECTS

TYPES OF EQUIPMENT . . . CLEANERS . . . ROUGHING . . . RUST PREVENTIVES . . . FINISHING . . . PROCESSING OF SAMPLES . . . SEPARATION OF WORK FROM ABRASIVE . . . WASHING . . . DRYING . . . RESCREENING OF ABRASIVE . . . MIXING DIFFERENT PARTS.

GET THIS MONEY-SAVING INFORMATION

The new booklet also tells you how Norton ALUNDUM* tumbling abrasive — especially developed to meet industry's wartime needs for fast, efficient small parts finishing — has become a standard barrel-finishing medium in plants throughout the country.

Learn how this tough, hard abrasive helps you to shorten tumbling cycles, reduce scrap and reworking, and gives you consistently better finishing of parts ranging in size from tiny rivets to larger castings. Ask your Norton distributor or representative for your free copy of "Barrel-Finishing With ALUNDUM Tumbling Abrasive," or write us direct.

NORTON COMPANY, WORCESTER 6, MASS.

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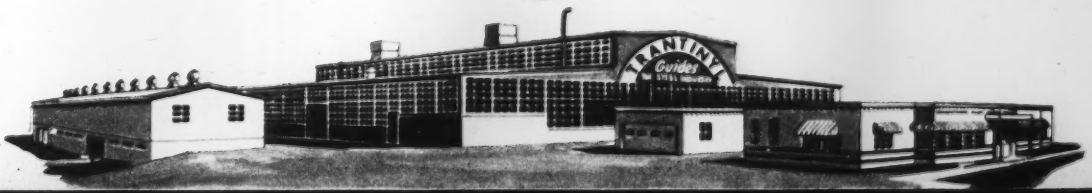
ABRASIVES
Making better products to make other products better

TRANTINYL

guides the steel industry



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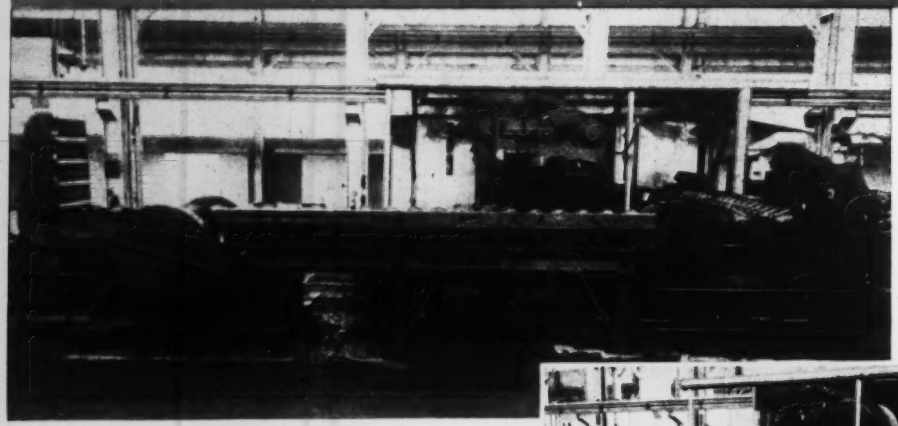
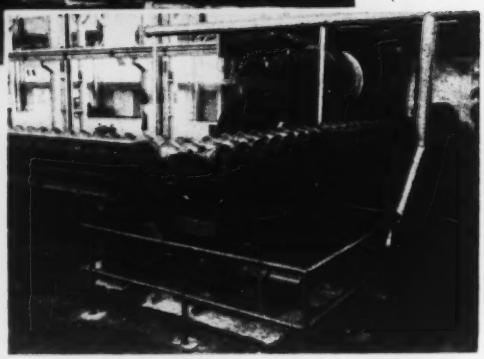
ROLLING MILLS: bar, hoop, strip, shape mill guides, and rollers. SEAMLESS TUBE MILLS: guide shoes, rolling mill plugs and rolls, piercer points, etc. ELECTRIC WELD TUBE MILL: forming rolls, planishing rolls, tool holders, etc. • STRAIGHTENING MACHINE GUIDES • HEAT RESISTING CASTINGS

Treadwell



Courtesy of Aluminum Co. of America



TREADWELL UPCOILERS for the FERROUS and NON-FERROUS STRIP INDUSTRY.

The above Coiler and Coil Handling Equipment is being used on what is probably the largest Aluminum and Aluminum Alloy Strip Mill in operation. The Coiler automatically transfers the Coil to a Turn Table. The Coil is turned 90° and deposited on a Run-out Conveyor to a Downender. The Downender sets the coil on end, depositing it on a Storage Conveyor for distribution.

Our Engineers will be glad to discuss your Hot and Cold Strip and Coil problems with you. We manufacture all types of Rolling Mill Equipment including Blooming Mills, Bar Mills, Rod Mills, Plate Mills, and Strip Mill Machinery, as well as Slab, Billet, and Bar Reheating Furnace Equipment.

Treadwell Engineering Company

EASTON, PA.

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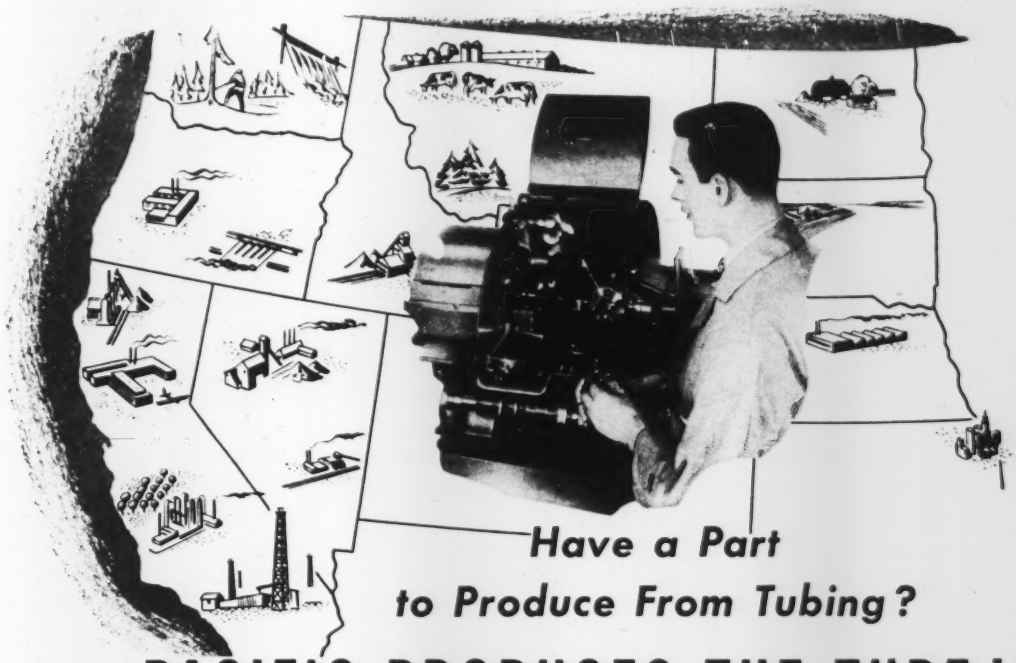

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PACIFIC PRODUCES THE TUBE!

Sizes and Analyses

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MT—1015, 1020, 1025
Round: ¾" to 2¾" O.D.
Square: ¼" to 2" O.D.

SEAMLESS ALLOY
4130—NE 8630
Round: ¾" O.D. to 3¾" O.D.
Square: ¼" to 2" O.D.

CHROME
4%-6%, 6%-8%, 8%-10%
¾" to 1⅝" O.D.

STAINLESS STEEL
Seamless and Welded
Types 304, 316, 321, 347.
Round: ¾" to 2⅛" O.D.
Square: ¼" to 1⅞" O.D.

WELDED CARBON TUBING
¾" to 3" O.D.

BARS

C 1018 B1113

COLD FINISHED
⅜" to 2½"

For Other Shapes, Contact Mill.

If you are fabricating tubing into finished parts . . . manufacturing small parts that require piercing before forming or machining . . . if your process or product requires a conductor for fluids, or strong, light-weight structural parts . . . you can profit by calling Pacific Tube Company. We can serve you quickly and economically.

Pacific has the modern tube mill and the facilities for the *quality* production of tubes, rods and bars in a wide range of sizes and analyses. All of Pacific's production is drawn and finished to suit the most exacting specifications for dimension, analysis and finish. In addition, we may be able to help you solve tubing problems with assistance in metallurgy, engineering or design.

Get more information about Pacific Tube Company products and service today. Clip and mail the coupon for our newest Tubing Bulletin or to have a representative call. No obligation, of course.

West Coast Distributors for:

Superior Tube Company, manufacturers of fine small tubing in all analyses from .010" to ⅝" O.D. and in certain analyses (.035" max. wall) up to 1⅜" O.D.

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First Steel Tube Mill in the West

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Please rush me your new Tubing Bulletin.

Have your representative call.

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ADDRESS_____

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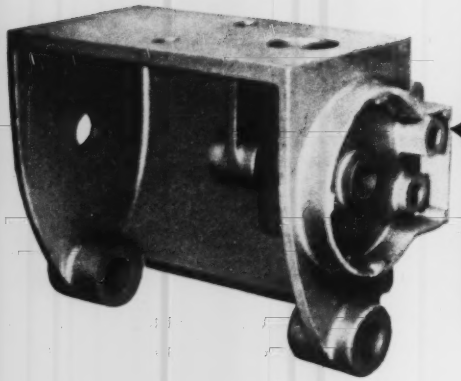
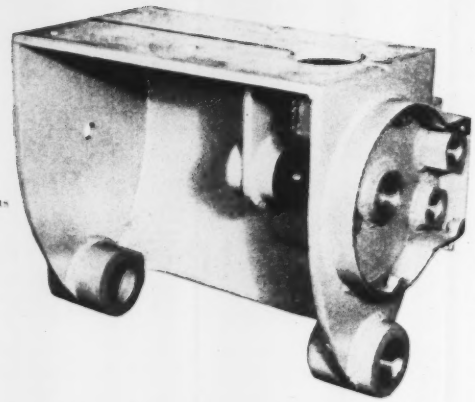


Gearbox for power-driven saw, as cast in Gray Iron.

45% SAVED...
on original cost of part

41% SAVED...
on machine and labor expense



Fabricated gearbox, which was replaced by the cast design.

By redesigning in Gray Iron, it is often possible to effect substantial cost savings. Here is a striking example:

> The manufacturer of a large power-driven metal saw found that the cost of a fabricated gearbox (right above) was out of line from a competitive standpoint. Designs for a suitable Gray Iron casting were requested and approved. Result: the Gray Iron casting is effecting a saving of 45% on original cost of the part, plus a saving of 41% on machine and labor expense.

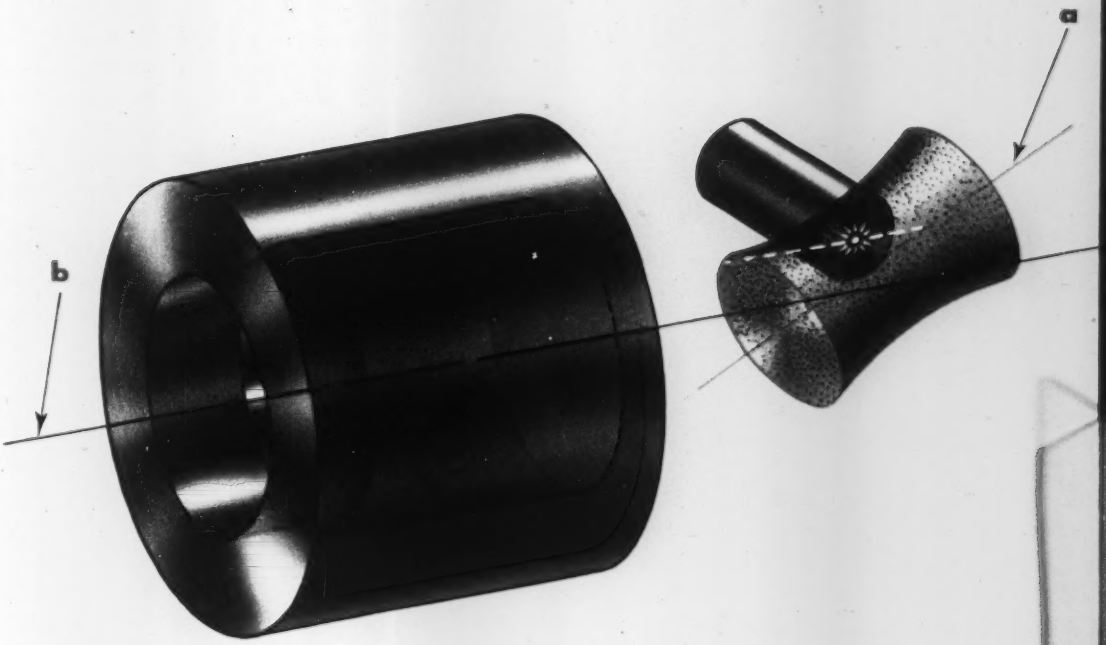
Doesn't this suggest that it's time to analyze *your* costs on certain fabricated parts with a view to producing them better and more economically in Gray Iron? Write for technical information on the many advantages of the Gray Iron casting process.

GRAY IRON
Characteristics Include:

- Castability
- Rigidity
- Low Notch Sensitivity
- Wear Resistance
- Heat Resistance
- Corrosion Resistance
- Durability
- Vibration Absorption
- Machinability
- Wide Strength Range

Make it Better with Gray Iron • **Second largest industry in the Metal-working field**

GRAY IRON FOUNDERS' SOCIETY, INC.
NATIONAL CITY-E. 6th BLDG., CLEVELAND 14, OHIO



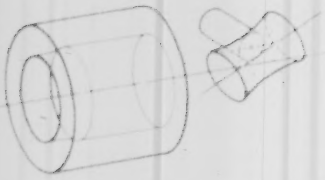
bryant
internal grinding

IT is generally believed in internal grinding that once the grinding wheel passes the diamond, the form of the wheel will be a perfect cylinder. In our illustration the wheel is tipped as it passes the diamond and an hourglass form is generated on the wheel. This condition is not peculiar to an internal grinder. The same form is generated in turning an O.D. on a lathe if the tailstock is either high or low.

The path of the diamond is a straight line across the surface of the wheel, but the wheel will not contact the work on the same straight line. Contact may be at a point on each end of the wheel. Since the wheel does not contact across its full face, wheel wear will be excessive and the wheel will act soft.

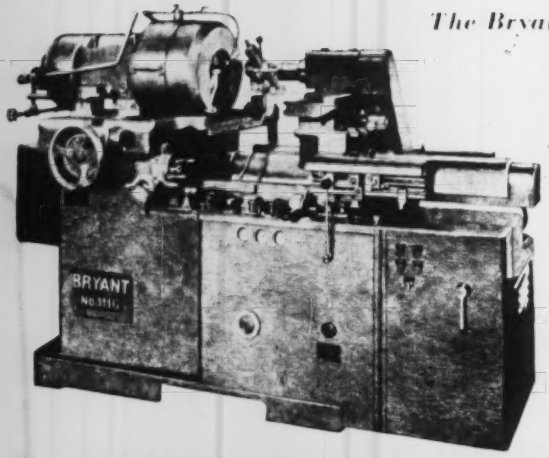
The geometry of the hole may be upset as in the illustration, with the result that the back of the hole will be tight. Neither turning the workhead nor changing the length of traverse will correct this error. Because the wheel is contacting at either one or two points, instead of a straight line, the surface finish will be poor. The remedy is to correct the alignment by bringing the wheel center line "a" parallel with the path of the wheel and in plane with the work center line "b".

Bryant Chucking Grinder Co. Springfield, Vermont



bryant
internal grinding

Accurate alignment of various machine elements is a basic consideration on even the simplest machine tool. Industry's demand for increased production and accuracy makes the alignment problem more critical than ever before. Bryant machines are designed so that they may be aligned, and this alignment may be maintained throughout the life of the grinder. Alignment and its effect on precision hole grinding is discussed on the preceding page.



The Bryant 11I6 Hydraulic Hole Grinder

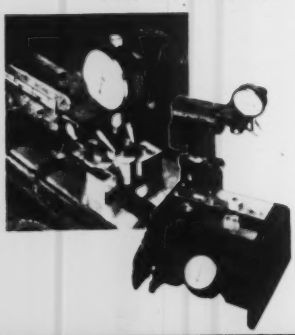
This is a precision toolroom and production hole grinder with all features and controls necessary for handling a variety of work with minimum time and effort. It has a swing of 16" with 8" maximum hole depth. The rigid 3-point wheel spindle support consists of a bar mounted in 2 cylindrical bearings with the rear of the slide supported on a hardened and ground guide plate. Tapers up to 90° included angle may be ground. A face grinding spindle may be used in addition to the hole grinding spindle. Write for full information.

Bryant Chucking Grinder Co., Springfield, Vermont, U. S. A.

bryant
thread gaging

Bryant gages are built on the principle of an "expanding" master plug for checking internal parts, or a "contracting" master ring for checking external threads. A dial indicator gives a reading of P.D. which includes variation in thread form and lead. This is an accurate indication of assembleability.

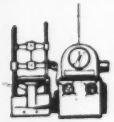
The Bryant Thread Gage with Squareness-of-Face Attachment



When a face must be checked square with an internal thread, the part should be held on the thread flank and rotated in this position. The Bryant Gage does this, regardless of variation in roundness, P.D., lead or thread form. The squareness-of-face indicator is raised by a yoke at a constant rate regardless of face run-out, thus giving a direct and exact reading of squareness with the thread axis. Simultaneous readings can be made — the Bryant Gage checks thread size the Attachment shows face run-out.

WING NUTS

Think of CENTRAL



RESEARCH—An outstanding creation, Central (Patented) Stamped Wing Nuts answer the demand for a sturdy, low cost thumb nut. Available in steel or brass they provide easy adjustments and improve the serviceability and appearance of your product.

KNOW-HOW—Central's special skill in the manufacture of wing nuts is not limited to the stamped wing type with its many variations. Central also produces solid, sturdy, pressed wing nuts in four standard blank patterns, brass or steel, with all standard threads.

QUALITY—Central's research and know-how coupled with high precision, high speed equipment, insures unsurpassed quality in standard or special wing nuts that spin-on and grip securely. We invite you—take advantage of Central's ability to produce for you . . . fast!

"You Can Depend on Central"

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From time card to travel ticket

Every angle completely covered . . . but one! When fire strikes during the night your skilled labor may go in the morning. The fully experienced Joes, Bills and Toms can't stand the financial strain of waiting . . . their time cards can become travel tickets to new jobs, while you're struggling to replace the ravages of fire.

The threat of losing your skilled labor due to an unexpected fire tragedy can be fully eliminated. With C-O-TWO Smoke or Heat Fire Detecting Systems plus C-O-TWO High Pressure or Low Pressure Carbon Dioxide Type Fire Extinguishing Systems your plant can have fast, positive, round-the-clock fire watchman service simultaneously at each fire hazard point.

At locations where a deep-seated, smoldering internal fire as well as a fast burning external fire might occur, the smoke detector of a C-O-TWO Smoke Fire Detecting System, based on an exclusive operating principle, automatically detects the first trace of smoke, smoldering or fire.

For locations where excessive heat or combustion might cause a flash fire, the heat detectors of a C-O-TWO Heat Fire Detecting System automatically sound a warning at the first flash of fire.

Then clean, dry, non-conducting, non-damaging carbon dioxide is instantly released from either a C-O-TWO High Pressure or Low Pressure Carbon Dioxide Type Fire Extinguishing System into the threatened area. The fire is out in seconds with little if any interruption to operations and the carbon dioxide disappears without a trace . . . one of the safest fire extinguishing agents known . . . harmless to equipment, materials and finishes.

WHEN BUSINESS STOPS . . . INCOME STOPS!

Don't take chances with your investment. Secure the benefits of highly efficient fire protection engineering today . . . our extensive experience over the years is at your disposal without obligation. Get the facts now!

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MANUFACTURERS OF APPROVED FIRE PROTECTION EQUIPMENT

Squeez-Grip Carbon Dioxide Type Fire Extinguishers
Dry Chemical Type Fire Extinguishers
Built-in High Pressure and Low Pressure Carbon Dioxide Type Fire Extinguishing Systems
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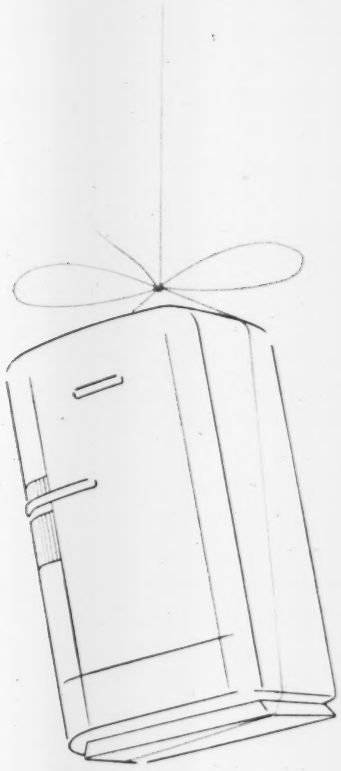
AFFILIATED WITH PYRENE MANUFACTURING COMPANY



When reputation hangs "by a thread"

the *source* of your threaded fasteners becomes vastly important

It's unlikely that any customer will ever know or care where you get the screws, bolts and nuts that hold your product together. But if just one of those threaded fasteners fails to hold properly and causes the customer serious inconvenience, your product gets the blame. To that extent, your hard-won reputation literally hangs "by a thread."

When you look to Pheoll for your every need in screws, bolts, nuts and special threaded fasteners, you've gone all the way toward making sure of *uniform, high quality*. Pheoll's half-century of experience, constant research and rigid product inspection assure this. And with Pheoll Quality, you now get these PLUS services!

First, new, efficient procedures for production scheduling and order control that add up to "delivery promises that count." ***Second,*** truly modern facilities so extensive they'll easily meet your toughest schedule demands or volume requirements. ***Third,*** cost saving design and engineering assistance to simplify your fastener problems. ***Fourth,*** experts in special products, and producers of the most complete standard product line in the screw industry. ***Fifth,*** continuously large inventories of both finished goods and raw materials assure prompt deliveries of your requirements.

The full facts are so remarkable they've been put into a booklet titled, "Pioneering in Customer Service." May we send it to you?

PHEOLL

MANUFACTURING COMPANY

5700 ROOSEVELT ROAD, CHICAGO 50, ILL.

SCREWS
BOLTS
NUTS

"THE GREATEST BRAZING SHOW ON EARTH"

INTERESTING! AMAZING! EDUCATIONAL!

Three-ring exhibition of metal joining strength, speed and versatility by those world-renowned performers—the EASY-FLO and SIL-FOS family of low-temperature silver brazing alloys.

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EASY-FLO and SIL-FOS in an eye-opening demonstration of ease and versatility in joining metals with the gas torch . . . Also, for the first time, a surprising exhibition of cemented carbide tool tipping by a new member of the famous H&H brazing troupe —Trimetal.

CENTER RING →

The great EASY-FLO in a stirring demonstration of production brazing—showing this alloy turning out brazed assemblies with the greatest of ease on a rotating table, gas-air heating set-up.

REVEALING SIDE SHOW

Typical case histories and examples of EASY-FLO and SIL-FOS brazing . . . Details of H&H's nation-wide brazing service and cooperation in applying the alloys . . . Brazing experts always on hand to talk with you about specific jobs.

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IF YOU DON'T GO TO THE SHOW . . .

. . . You still can get the whole Easy-Flo and Sil-Fos metal joining story promptly. Ask us to send a field engineer—he'll gladly talk over your metal joining problems. Or, talk with one of our distributors. Start the ball rolling now—write for Bulletin 20 giving the full money-saving facts. We'll also send you a list showing our nearest dealer. Write today.

85th Anniversary

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REPUBLIC UPSON SEMI-FINISHED AND COLD-PUNCHED NUTS

Wrenches fit Republic Upson Nuts squarely, snugly. There's less chance for slipping, less chance for deformation and rounding-off of nut corners.

Accurate, clean threads speed-up assembly, assure full thread area to grip uniformly and tightly.

More than 20,000 types, sizes, and shapes of Republic Upson Nuts and Bolts let you provide your product with the long-lasting advantages of these top-quality fasteners.

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Tells where tar base coatings can save you money in your plant . . . what grades to use . . . how to apply them.

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PITT CHEM 101
A versatile, heavy duty coating that withstands severest corrosive conditions.

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A thin, high gloss maintenance coating for steel and concrete surfaces.

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A heavy duty coating for metal exposed to corrosive vapors, dilute acids and alkalis.

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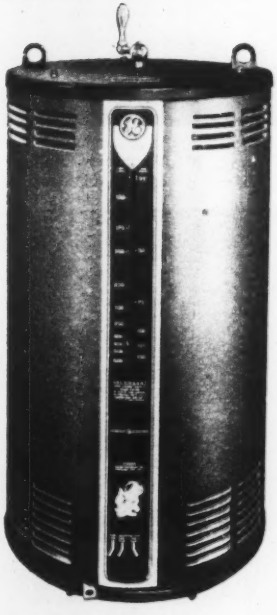
Now You Can Weld Easier and Faster

THESE 5 G-E FEATURES TO HELP YOU



Generous overtravel makes accurate current settings easy.

1. **SMOOTH, FAST WELDS** are simple to make with the steady arc because arc-stabilizing capacitors eliminate popouts.
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5. **LONG COIL LIFE** is assured with Class H silicone insulation, exclusive with G-E.

TO GET YOUR SHARE of these big welding benefits, call or see your nearest authorized G-E welding distributor! His name is listed in the yellow pages of your telephone directory. Look for General Electric under "Welding Equipment."

Section K 711-24, General Electric Company, Schenectady 5, N. Y.

Please send me immediately information on a typical G-E a-c welder, GEC-750.

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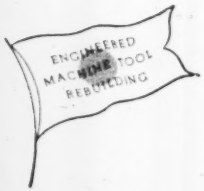
GENERAL ELECTRIC

"Life Extension Institute" for Your Machine Tools



Speed was the problem here. As part of the Government machine tool re-activation program, Simmons has rebuilt over 400 machines. Shown in this bay (fore) are automatic screw machines, deep-hole drillers and various special tools. Despite this program, Simmons was able to continue its rebuilding for industry—thanks to its 120,000 square feet of plant capacity and diversified equipment.

Alignment of head and tail stock is part of the final test of this Landis grinder.

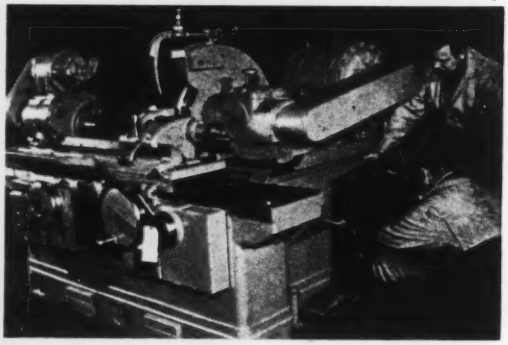
Sand blast facilities are maintained at Simmons to clean cast parts, remove inclusions.

Modernizing: To adapt these deep-hole drillers for carbide tooling, speed was doubled from 1500 to 3000 rpm; cooling system pressure was increased; heavier electrical equipment installed.

Rebuilding is the fastest way to get machine tools *today*. You will find that there are no long waits for delivery. *Engineered Rebuilding* guarantees user satisfaction. If you'd like to learn more about it, write for our quarterly, THE SIMMONS WAY.

SIMMONS MACHINE TOOL CORPORATION
1755 North Broadway, Albany 1, N. Y.

SIMMONS GIVES USED MACHINE TOOLS A NEW LEASE ON LIFE



Checking electrical systems is an important part of Simmons *Engineered Rebuilding*. Here, two technicians check a control panel on a rebuilt Cincinnati grinder prior to inspection.

Give us a chance

at your wire problems

STEEL WIRE is such a vital part of so *many* products that maybe you tend to think of a wire part as a staple item—something that can be used indefinitely in its present form.

That isn't always true. Wire, and the time needed to fabricate it, can become a hefty cost factor.

That's where we can help. Our engineers have encountered just about every problem in the history of wire fabrication. They know that, no matter what you make—ash-can handles, springs or paper-clips—there is often a way to lower costs by means of better wire selection or better fabricating methods.

This rich background of experience is valuable today because some types of wire are hard to get and our men are good at suggesting alternates. And, if your over-all costs are getting out of hand, we may be able to uncover an easier, cheaper way to fabricate your wire products. We may be able to work out a minor design change with you that will lower costs without adversely affecting performance.

Just call our nearest district sales office.

AMERICAN MANUFACTURERS WIRE

AMERFINE—*High-quality fine wire.*

AMERSPRING—*music steel spring wire.*

AMERLOY—*alloy heading wire.*

AMERTEMP—*heavy-duty oil-tempered wire.*

AMERHEAD—*uniform heading wire.*

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one man moves up to 15 tons

It's *100%* easy handling of heavy loads with the Trav-Lift! No out-of-reach spots, no traffic-jam delays, no rehandling . . . *this way!* Lift, transport, lower and stack materials *anywhere* within an entire bay area. It's all done through the air, all by just *one* man.

That's why, when requirements call for cranes, P&H Trav-Lifts are first choice for fast handling. In the Trav-Lift, you get a custom-made crane at "stock" prices . . . because P&H uses standard money-saving designs . . . because P&H builds the entire unit, electrical equipment included.

You can have the Trav-Lift with cage or floor control . . . with various spans and lifting speeds and in capacities to 15 tons. It's another quality product of P&H . . . America's largest builder of overhead handling equipment. Your call to P&H will bring an expert anxious to help with your handling problems.

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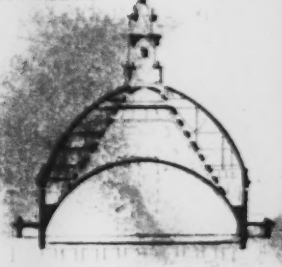
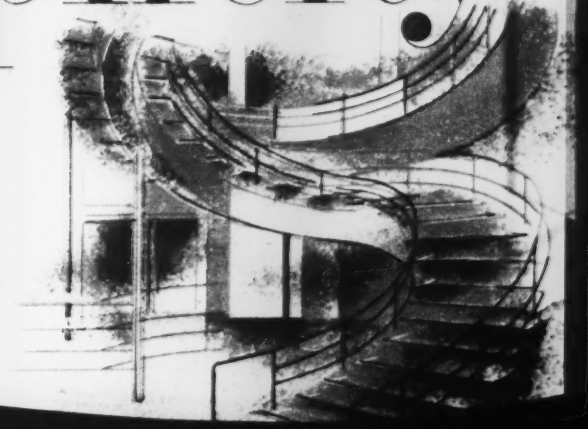
"Reader, if thou seekest his monument, look around." INSCRIPTION ON SIR CHRISTOPHER WREN'S TOMB IN ST. PAUL'S CATHEDRAL



From the ashes of the Great Fire in 1666 emerged Sir Christopher Wren's masterpiece—St. Paul's Cathedral—with its soaring central dome "rising from the mists of London, like an Alpine peak". ★ In designing the dome, Wren solved with amazing simplicity one of the most difficult structural problems in architecture—how to support a great central dome without using excessively heavy and constricting crossing piers. ★ This same simplicity, combined with unusual structural engineering knowledge, enabled Wren to produce diverse effects in his many buildings without expensive elaboration.

simplicity

Whether hidden from sight doing a functional job, or exposed to view just looking pretty, Van Huffel metal shapes and tubing simplify a lot of today's building problems. ★ Architects, designers and engineers know they can incorporate in their designs strength without excessive weight . . . economy without sacrificing quality . . . and simplicity without complicated assembly. That's why they are continually thinking up new uses. That, too, is why they keep coming to Van Huffel —where ideas take shape—in metal.

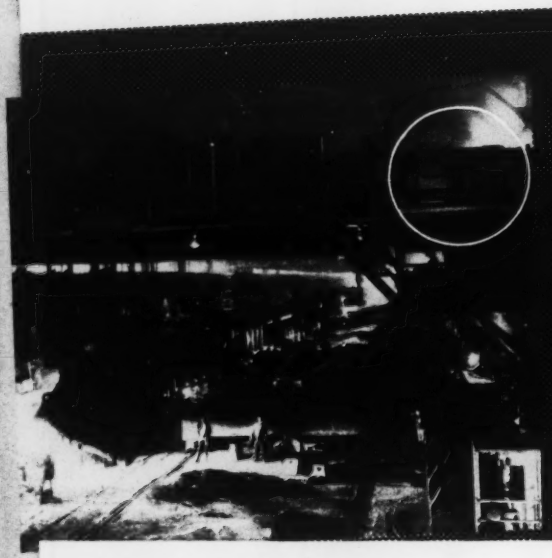


Van Huffel

TUBE CORPORATION · WARREN, OHIO

WELDED · LOCK SEAM · OPEN SEAM · BUTTED TUBING · METAL SHAPES · MOULDINGS

Large tube manufacturer uses DRAVO crane cab coolers in open hearth operations



CAB TEMPERATURE REMAINS CONSTANT; DUSTS, FUMES, GASES, DIRT ELIMINATED

In open hearth charging operations, crane cab operators are subject to heat from 135° to 150° F., plus such nuisances as dusts, fumes, gases and dirt. To eliminate such unpleasant working conditions, this large tube manufacturer has installed Dravo Crane Cab Coolers on open hearth charging cranes.

Results: cab temperatures constant at 80° to 85° F., winter or summer; healthier workers and more efficient operations.

CRANE CAB COOLERS HAVE LONG SERVICE LIFE, PROVIDE YEAR-'ROUND AIR CONDITIONING

Dravo Crane Cab Coolers are ruggedly constructed, factory assembled and pretested to provide years of satisfactory service. All equipment in the unit is readily accessible with ample space for quick and efficient maintenance.

In the various air conditioning functions the crane cab cooler not only filters the air, removes dust, dirt and fumes, but heats the cab in winter, cools it in summer and provides constant ventilation the year around.

AVAILABLE IN SINGLE UNIT OR IN SPLIT-TYPE UNIT; IMMEDIATE DELIVERY

Dravo Crane Cab Coolers are built in two models—the self-contained unit, mounted close to the cab, and the new split-type unit where the condenser section is mounted on the crane with the evaporator section in the cab.

The Dravo Crane Cab Cooler can be easily and quickly installed on any type of crane with a minimum of down-time required. Units are available now!

Write for more information—or phone the nearest Dravo Office and have our representative call on you.

DRAVO

DRAVO CORPORATION

606 Dravo Bldg., Fifth and Liberty Aves.
Pittsburgh 22, Pa.

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Better looking, better performing

The mirror-like finish and exact gauge of McLouth Stainless Steel gives you better production performance on every job.

McLouth Stainless Steel is manufactured in a wide range of grades and finishes and the exact chemical composition of the steel is determined for every order. It has a high resistance to corrosion, heat and wear to give your products better appearance and longer life.

Ask for a McLouth Service Engineer to analyze your stainless requirements. When the product you make today, or the product you plan for the future calls for stainless, *make it with McLouth Stainless Steel.*

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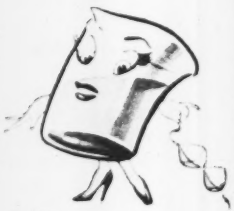
HOT AND COLD ROLLED STAINLESS AND CARBON SHEET AND STRIP STEEL

NEW SOLUTIONS FOR OLD FINISHING PROBLEMS

ENTHONE CAN SHOW YOU HOW TO DO ANY OF THE FOLLOWING:

1. Remove rust and scale from steel in an alkaline solution ***without any attack on the steel***
2. Strip nickel, lead, tin, solder, silver and copper from steel without any attack on the steel
3. Electroplate on aluminum for soldering
4. Remove excess silver solder from steel
5. Phosphate and clean steel in one operation
6. Prevent rusting of steel during drying or storage
7. Color aluminum without electric current
8. Strip enamels from plastics
9. Remove heat scale from copper alloys without etching the base metal
10. Chromate zinc and cadmium for high salt spray resistance



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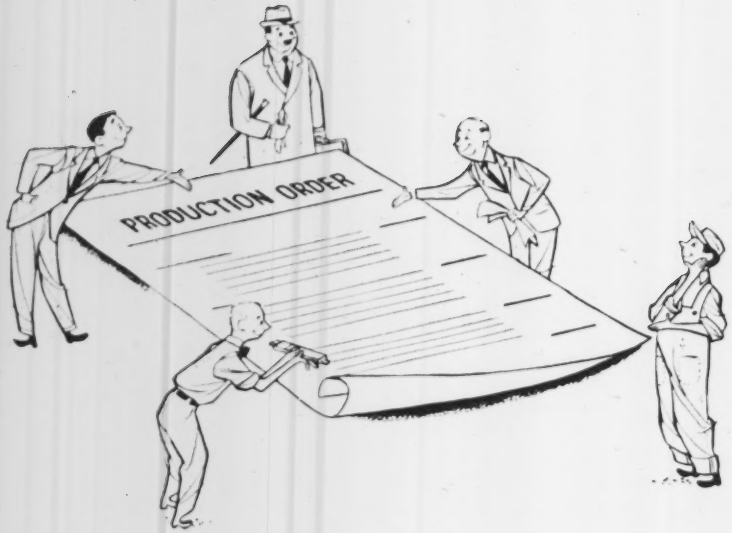

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Though the strike left our stocks rather low, we're happy to report that they are now being replenished rapidly and should soon be more nearly normal. Meanwhile, our consultants may be able to help by suggesting ways of meeting your needs with the steels that are available right now. So bring your questions, your blueprints, your samples to this Ryerson panel of experienced steel men—at the National Metal Show, October 20-24. Our booth is No. 318.

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October 13, 1952

Hot Development: Plastic Dies

Plastic dies are currently one of the hottest developments to hit the auto industry. Ford plastic dies are now being used in several plants, and another process using resin and glass-fiber laminates is having a trial run by Fisher Body Division of General Motors at Flint, Mich. Cost is reported to be one-half to one-quarter of that for metal dies. The plastic type thus far has been most successful for short or moderate-run parts.

Chevrolet Change-over in December

Chevrolet is now tooling up for a completely new 1953 model, aimed at paring down some of the gains made by Ford's 1952 cars. Chevrolet's 1952 production runs will continue at the present high schedules until about Dec. 1. Then, they'll be halved for a month while the change-over is made. Assemblies of the 1953s will begin around the first of the year.

Money Tightens

Jobbers, especially steel warehousemen, find that collections are more difficult. That indicates a tighter money supply. The situation is not yet serious, but it's the first time since the Korean War started that there's been much trouble with the matter at all. You can expect the collection problem to remain about as it is now until tax time next March. After that it should improve a little.

Dutch Money in Canada

American and British capital isn't the only money pouring into Canada to help finance the dominion's expansion program. Some $5 billion, all-told, is going into new construction, machinery and equipment this year, compared with $1.7 billion in 1946 and $765 million in 1939. Individuals and companies in other countries, especially Holland, are showing a lively interest, too. One such firm is G. Dikkers & Co., Holland, which is studying the possibility of establishing a $1-million plant at Edmonton, Alta., to manufacture and assemble steel valves.

Opportunity in Port Facilities

Now that the *SS United States* has been completed, no spectacular American shipbuilding projects are in the works, although a small but steady tanker and merchant building program will continue, especially for Mariner class ships. The major opportunities relating to ships for the next year are in construction of port facilities. The Maritime Administration will soon reveal details for a port development and utilization program to cope, first, with mobilization conditions and, later, a long-range program aimed at reducing port time for the merchant marine.

Well Thought Of

David L. Cole, new head of the Federal Mediation Service, is well thought of. The retiring Cyrus Ching had a lot to do with his appoint-

Production-Engineering News—p. 147 The Market Outlook—p. 345

ment. Like Mr. Ching, Mr. Cole is a Republican. The new chief says he will recommend to Congress the passage of legislation which will eliminate the need of a Taft-Hartley injunction or government seizure to prevent shutdowns in vital industries.

Troubles Among Aircraft Workers?

Troubles among aircraft workers are not over. Douglas and Lockheed employees ended their walkout reluctantly after President Truman's patriotic appeal and promise of a new attempt to reach a fair settlement. International Association of Machinists, representing 70 per cent of all U.S. and Canadian aircraft workers, including the Douglas and Lockheed strikers, is none too happy and makes vague attacks on Aircraft Industries Association, claiming that "AIA has become the controlling factor at all negotiations between aircraft managements and unions."

Defense Notes

Some prime contractors who have government orders for airplanes are placing subcontracts for only a calendar quarter at a time . . . In heavy production all next year will be 155 mm ammunition . . . Tank output will reach its peak next spring.

Straws in the Wind

Approval of the St. Lawrence Seaway by Congress next year may result from a $100,000 "all-out drive" fund pledged by the auto industry . . . Bethlehem Steel Corp. is borrowing $100 million for an as-yet-undisclosed purpose . . . First use of titanium in aircraft production is announced with substitution of the metal for sheet steel in certain B-36 airframe parts . . . Hardware retailers are warned to adjust their businesses to "a returned normal buyer's market" as larger amounts of materials are freed by the government for peacetime use . . . Prime aluminum products manufacturers can't operate under the 1-cent per pound pig and ingot increase with the 5 per cent ceiling price hike on aluminum shapes; OPS says it will take another look . . . A study is being made to determine legislation needed for controls.

What Industry Is Doing

Dwindling profits after taxes presents a challenge to industry's cost-cutting methods (p. 119) . . . Unions want a wage formula based on productivity but the trouble comes in finding an accurate measurement for it (p. 120) . . . Shades of Buck Rogers appear as the Army unveils its atomic artillery piece, under contract since Sept. 27, 1951 (p. 121) . . . Iron ore supplies should enable steel producers to squeak by at full capacity this winter (p. 122) . . . Soft spots develop in the used machinery market while demand for certain types of late, used tools remains abnormally high (p. 123) . . . Defense program may veer toward higher output as basic materials expansions near completion (p. 124).

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NICKEL CAST IRON PROVIDES HIGH STRENGTH AND PRESSURE TIGHTNESS...

Water boxes produced of nickel cast iron by Kutztown Foundry & Machine Corp., for Foster Wheeler Corp., to obtain greatly improved physical and mechanical properties in these large castings.

IN CASTINGS OF LARGE DIMENSIONS

Here are three water boxes, weighing 21,500 pounds each, for a power-plant condenser system designed by Foster Wheeler Corporation, New York City.

Excessive pressures of the service involved call for high strength, as well as high density of grain structure.

Accordingly, these water boxes, produced by Kutztown Foundry & Machine Corporation, Kutztown, Pa., were cast in 2% nickel cast iron.

Meeting ASTM "Class 50" specification (minimum 50,000 psi tensile strength) and characterized by dense structure with fine dispersion of graphite throughout, this nickel cast iron provides an extraordinary degree of pressure tightness under hydrostatic pressures.

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Your Stake in Jetomics

Next week thousands of management executives, operating men and technicians of the metalworking industry will go to Philadelphia to attend the annual National Metal Congress and Exposition. This is the 34th year in which it has been sponsored by the American Society for Metals and participated in by co-operating organizations.

If one were to summarize the problems and developments which were accorded major emphasis in the conventions and shows throughout these 34 years, he would have before him a thrilling, realistic panorama of technical progress in the metalworking industry. In the earliest events the accent was chiefly on heat treating. As the young society advanced in membership and influence, its interests broadened. They began to embrace all phases of metallurgy in ferrous and nonferrous metals. In a remarkably short time the Metal Congress and Exposition became sort of an official annual "check-up" of what is new in metalworking.

In this responsible role, next week's affair in Philadelphia offers unusual opportunities to those who desire to keep pace with current technological progress. Right now two of the contemporary developments which are most likely to influence operations in the metalworking industries in the next few decades are jet propulsion and atomic energy. The demands of these two new activities upon metallurgy and upon the metalworking industry are terrific. Their challenge to existing talents is unprecedented.

Much of this issue is devoted to problems of the "jetomic" age. Jetomic is a term that spans the field of jet propulsion and atomic energy. It symbolizes tomorrow's problems in the metalworking industry. It crystallizes in a single coined word the objective to which research workers, metallurgists, operating specialists and many others in metalworking are destined to devote their energies in the years ahead.

The jetomic age presents a challenge and offers opportunities to you. It is the coming thing in metalworking and you will be making a serious mistake if you underrate its potential. Why not go to the National Metal Congress and Exposition and learn first hand what jetomics means in dollars and cents to your company! You will be well repaid for your attendance.

E. L. Shaner

EDITOR-IN-CHIEF

OUTPUT FIGURES JIBE: Georgi M. Malenkov's five-and-a-half- hour speech to the All-Union Soviet Communist Party Congress in Moscow last Monday revealed official figures on Russia's production of certain basic materials. He reported production for 1952 as follows: Steel ingots, 35 million tons; pig iron, 25 million tons; rolled steel products, 27 million tons; coal

300 million tons; oil, 47 million tons; and electric power, 117 million kilowatt-hours.

A surprising thing about most of these figures is that they are quite close to what observers outside the Iron Curtain expected. When the editors of this publication were compiling world iron and steel production figures for the Yearbook Issue of Jan. 7, 1952, they estimated Russia's output for 1951 at 33,400,000 net tons of steel ingots and 23,500,000 net tons of pig iron. Malenkov's figures for 1952, converted from metric into net tons, indicate a gain in 1952 over our estimates for 1951 of 1,130,000 net tons of ingots and 1,900,000 net tons of pig iron. In short, the Kremlin's official count jibes pretty well with what outsiders guessed.

* * *

WE NEED MORE FACTS: Mounting pressure is being exerted upon employers to recognize increased productivity as a factor to be taken into account in determining wages. Many persons take it more or less for granted that productivity per man increases 2 or 3 per cent annually. This, of course, is a long-range, national average. How does it compare with actual gains or losses in specific industries?

Austin M. Fisher and Fred Rudge answer this question for one industry in a monograph entitled "Productivity as a Factor in Wage Determination." They report that in primary smelting and refining of nonferrous metals (p. 120) the annual change in productivity from 1939 to 1950 ranged from minus 5.2 to plus 9.6 per cent. Over-all gain for the 12-year period was 5.7 per cent. Meanwhile, hourly earnings went up 118 per cent.

Productivity as a wage determinant probably will be with us a long time. Therefore, we need much more factual information about it than we have to date.

* * *

FACE LABOR SHORTAGE: Men in motordom will heartily agree with Elbert Hubbard and Frank Ward O'Malley that "Life is just one damned thing after another." Only a few months ago they were crying to high heaven for more steel. Skilled manpower was no problem at all. In fact, as recently as last winter unemployment in automobile centers in Michigan was an acute problem.

Today automobile manufacturers are worried about the labor supply. They believe that by mid-January of next year (p. 133) the manpower shortage will rival that experienced at the peak of World War II. Women, and people migrating from the South, who helped to save the day in the forties, cannot be recruited as easily now. New tactics are called for. Intelligent recruiting and job training, plus adjusting the work to the available talent, are the most promising improvisations.

* * *

CONTROLS AT ANY COST: Under Tighe E. Woods, new OPS administrator, attempts will be made to continue price controls whether or not they are needed. The strategy, CIO inspired (p. 126), will be similar to that employed in rent control.

It will be remembered that some cities decided to extend rent control nine months beyond last Sept. 30, while an almost equal number of cities elected to end controls. The government's Defense Area Committee declared many of these latter cities to be critical defense areas. In this way, Washington bureaucracy overruled local authority.

OPS can be expected to fight to retain price controls long after there is any real need for them. One method it will use is to try to convince buyers that sellers are making excessive profits. OPS earnestly declares it will not maintain controls for controls' sake, but past experience disproves this emphatically.

* * *

THINKING FAR AHEAD: Charles F. Kettering once described industrial research as "simply trying to find out what you are going to do when you can't keep on doing what you are doing now." Leaders in automotive research are thinking a long way ahead in determining "what they are going to do."

For instance, many of them (p. 166) are counting confidently on the possibility that materials for use in the 2000 to 3000° F range will be developed in the not too distant future. They look for marked progress in producing ceramic or ceramic metal compounds capable of standing rapid temperature changes. They expect metals will be produced to realize a much higher proportion of their theoretical strength.

Success in any one of these ambitious undertakings would set off a new chain reaction of accelerated technological progress in metalworking.

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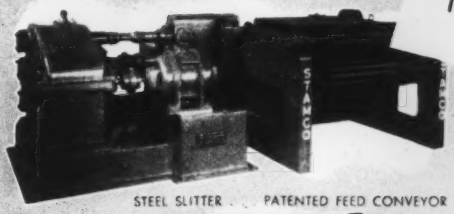

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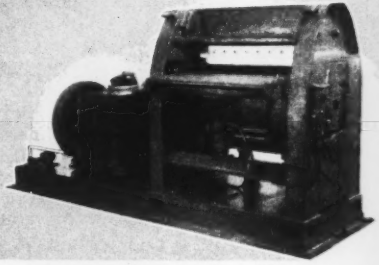

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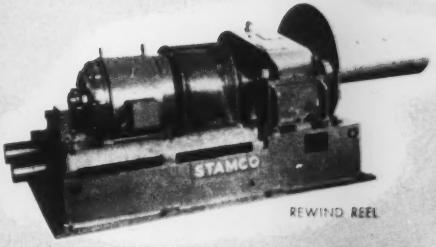

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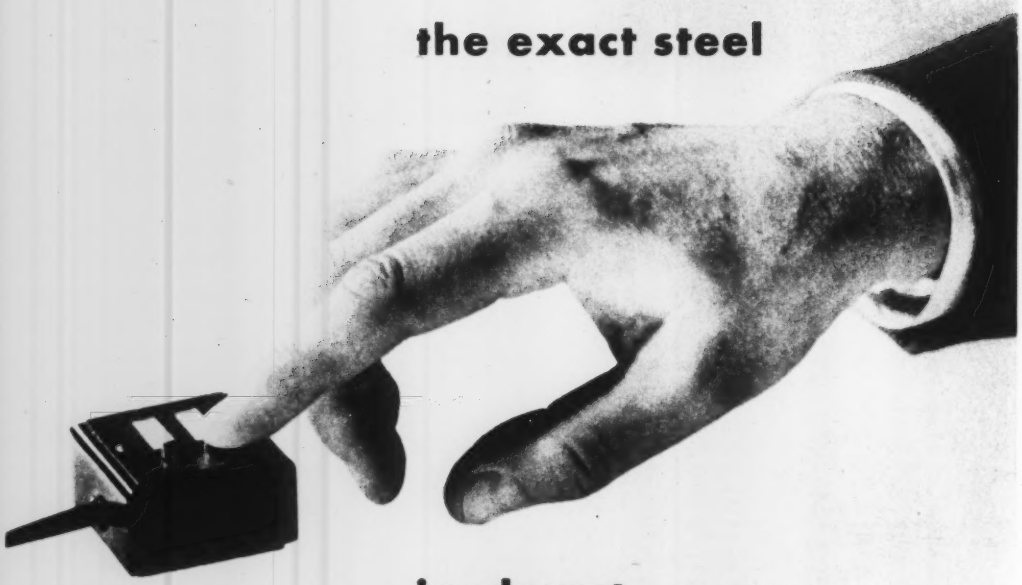

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Pressure on Profits Mounts As Metalworking Sales Soar

The plummeting net profit per sales dollar may bring more pressure for mechanization as the most available method of cutting costs. The fight to relieve the federal squeeze on income will also be heightened, but industry can expect the surest results from its own machinery

A RECORD industrial cost-cutting program—primarily through increased mechanization and better machinery—is in the cards if businessmen hope to correct the dangerously low net profit per sales dollar estimated for 1952.

The accompanying table shows that the per-sales-dollar profits will slump to a postwar bottom this year for the average metalworking company, even though sales will be at an alltime high.

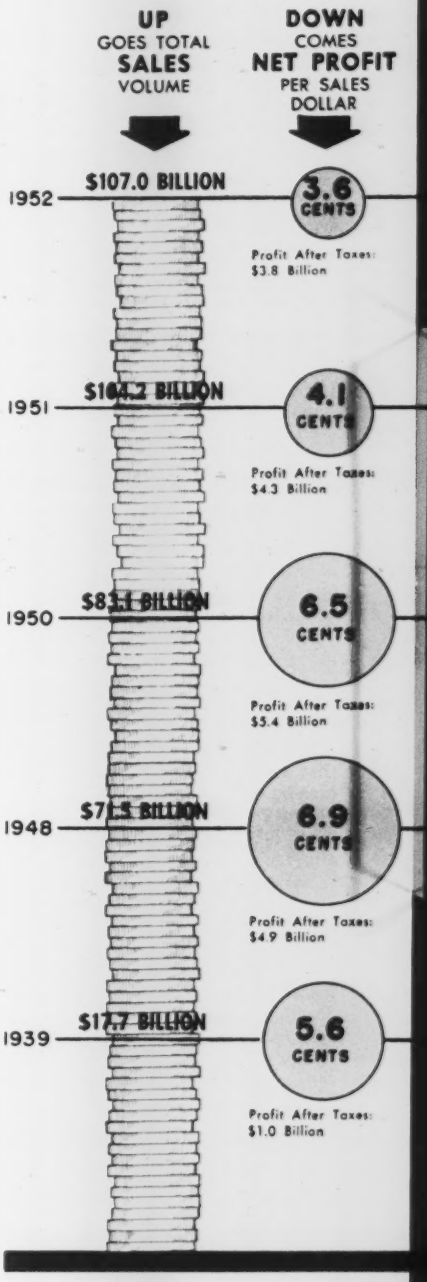
The Reason Why — Corporate taxes are the biggest reason for lower profits. The current levies were applicable for all of 1952, for only part of 1951. Rising costs, especially in wages, are the second important reason for lower profits. Coupled with that is price control which has not allowed price increases commensurate with cost rises.

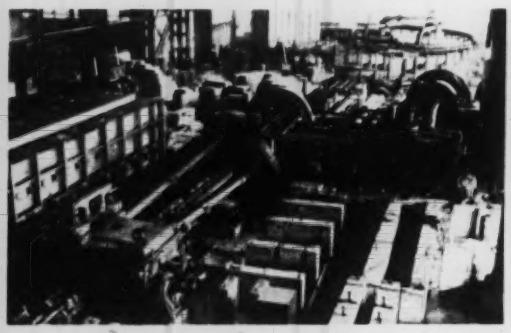
Increased mechanization, better machinery, improved materials handling equipment, cheaper packaging, more efficient distribution—all those and similar cost-cutting routes will probably be travelled heavily in the next few years. The traffic in those directions should be greater than along other avenues—lower taxes, no more wage rounds—which could also lead to improved profits. That's because the former routes are in industry's own bailiwick while the latter lie in areas where businessmen have much less control.

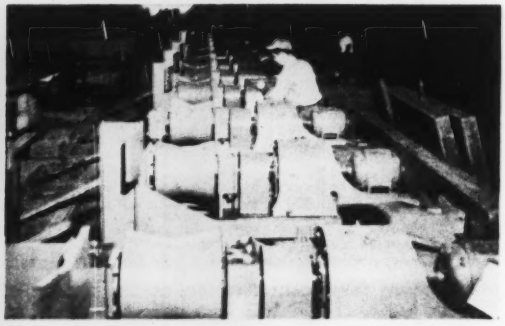
Proof of the Pudding—So, industry must turn to areas where it does have great control. It is already doing so in many cases. That helps explain why machine tool production may reach $1.1 billion in 1952 compared with $306 million in 1950, why belt conveyor output this year should hit about $70 million, 25 to 30 per cent above what it was in 1950 or why developments in packaging are now going on at a phenomenal pace (STEEL, Oct. 6, p. 57).

Yet, still more mechanization is required, for metalworking's—and all industry's—profit situation puts it on an economic tightrope. As long as it has high volume, it can make out all right, but the 3.6-cents-per-dollar profit margin puts its breakeven point so high that losses can come quickly. On the surface, corporate profits even after taxes today seem high. They'll be an estimated $16 billion in 1952, compared with $8.9 billion for that other peak year, 1929. Even when adjusted for the changing value of the dollar, 1952 profits are still 18.7 per cent above 1929. But in that time the real gross national product has jumped 109.2 per cent and personal income after taxes 90.9 per cent.

Silver Lining—The low-profits situation is alarming but not disastrous. If it keeps industry struggling for cheaper production, it can keep new plant and equipment expenditures high for years. Heavy capital outlays can always help mightily in keeping the economy going well, which, in turn, keeps moderate profits bearable. Expenditures this year will hit $27.5 billion. With the help of the profits situation, chances are good that the important outlays will stay above $20 billion annually for the rest of the decade.







New Seamless Tube Mill Aims at 150,000-Ton Annual Production

Republic Steel Corp.'s new seamless tube mill at its South Chicago plant is nearing completion. By the end of the year, it will be producing tubular products at an annual rate in excess of 150,000 tons. Before the tubes enter the mill, they will be heated in the 75-foot-diameter rotary hearth furnace in the background. A conveyor line, right, waits to carry the pipes to the sizing or reducing mill. Each roll has its individual 1½-horsepower electric motor

Productivity Puzzle

Unions want a U. S. wage formula based on productivity, but no good measure of it exists

DOES LABOR productivity regularly and measurably improve?

Unions claim that it does. They have even persuaded the Wage Stabilization Board to consider a national wage formula using the annual improvement factor.

The Claims—The CIO maintains that all workers should have their increases tied to a national productivity index regardless of the actual growth of their own particular industry or employer. It holds that all workers contribute to increased output, which it says is at the rate of 4 per cent per annum, and that all should share on a nation-wide basis. The AFL maintains that the national increase in productivity should be the minimum wage boost for all. It advocates a catch-up productivity wage adjustment of 11 per cent, based on its estimate of a 5.9 per cent increase in 1950 and a 5.4 per cent boost in 1951.

The union claims are challenged by Austin M. Fisher and Fred Rudge, of the managment consulting firm, Fisher, Rudge & Neblett Inc., New York and Los Angeles. In a monograph, "Productivity as a Factor in Wage Determination," they show that productivity changed in the primary smelting and refining of nonferrous metals range from minus 5.2 per cent to plus 9.6 per cent from 1939-1950, resulting in an over-all increase of 5.7 per cent. During that time, average hourly earnings in the industry went up 118 per cent.

Lack of Data—The study points out that reliable productivity trends are lacking for most industries and that the few which are available reflect wide variations from year to year. Contrary to wide assumption, there is no official government productivity index, nor any other which is accepted generally as an accurate measure. Union claims are based on a privately published index.

Regardless of the potent arguments against it, Mr. Rudge believes that "productivity as a wage determinant is here to stay, and management should explore the consequences and prepare itself for negotiating annual-improvement-factor demands when they come."

Price Violation Case Settled

OPS has agreed to settle its case against Barium Steel Co., New York, and its wholly owned subsidiaries, Phoenix Iron & Steel Co., Phoenixville, Pa., and Central Iron & Steel Co., Harrisburgh, Pa., for $1,011,123.

The three companies were charged with selling various steel products at above ceiling prices between Sept. 1, 1951, and Feb. 29, 1952.

Barium's arguments that the so-called overcharges were made in good faith and after legal advice were rejected by OPS. But the agency made no charge of willful violation against Barium, and the final settlement was for about half the original government claim.

Steel Output Heads Upward

Steel ingot production in September totaled 9,034,000 net tons, the American Iron & Steel Institute reports. In August it was 8,498,687 tons.

The September output was exceeded by that of January and March.

To turn out the September tonnage, the industry operated at 101.6 per cent of capacity. The August rate was 92.4 per cent.

French Steel Price Rolled Back

Steel prices in France will come out from under control of the Comptoir Siderurgique de France and go under control of government ceilings as a result of a decree by the French cabinet. The decree calls for a roll-back of prices on food and industrial products to the level of last Aug. 31. That won't make a big difference in steel prices immediately. But, it may be the opening wedge for competitive pricing against the ubiquitous French Comptoir which up to now has sold the entire output of all French steel mills and rolling mills for domestic or export use.

Atomic Artillery

Arsenals, Dravo, Kenworth and R. Hoe are among those co-operating to build the weapon

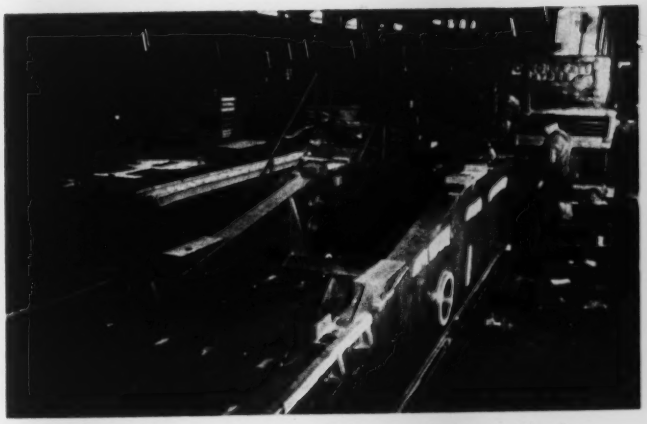
A TEAM of metalworking companies and designers made possible the construction of America's newest superweapon, an artillery piece capable of firing an atomic missile.

Prototype of the new gun was made piece by piece at Watertown Arsenal, Watertown, Mass. The first complex carriage and mount assembly was produced by Dravo Corp., Pittsburgh. Watervliet Arsenal, Watervliet, N. Y., manufactured the gun barrel and breach. The barrel is mounted on a 38½-foot carriage tranported by two tractor-type, Ordnance-Continental gasoline engines made by Kenworth Motor Truck Corp., Seattle. Recoil assemblies were built by R. Hoe & Co., New York.

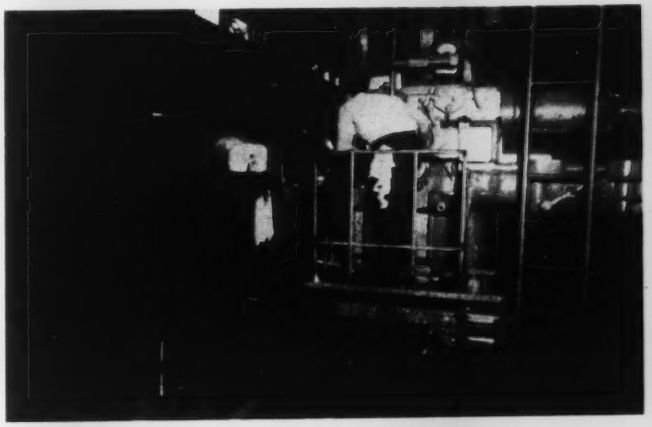
The Prime—Dravo is a prime contractor for an undisclosed number of carriage and mount assemblies, a few phases of whose production is shown in the accompanying pictures. It signed its contract Sept. 27, 1951, and shipped the first assembly just ten months later.

Highly mobile and four times more accurate at long range than pre-World War II artillery pieces, the weapon is able to fire other types of high-explosive projectiles as well as atomic projectiles. The gun is not much larger than the heaviest field artillery piece now in service. With its transporter, it weighs about 85 tons.

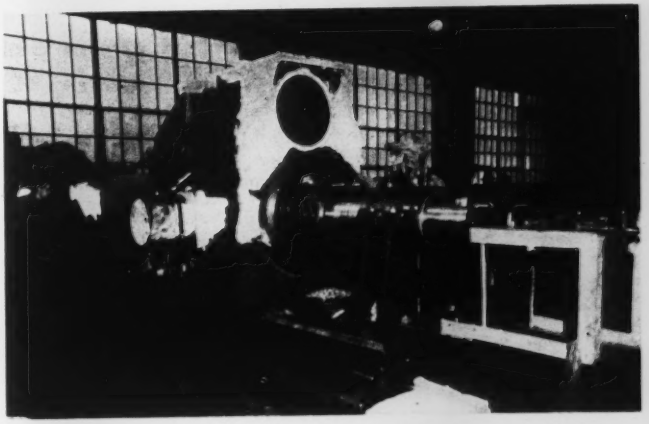
Co-ordination—Manufacture of the carriage requires the co-ordinated effort of Dravo's structural steel fabricating, machining, heat treating, electrical, piping and welding shops. Big machine tools for cutting, planing and milling were required. Unique jigs and fixtures had to be designed and fabricated for the job. Nearly 2200 separate blueprints govern the assembly.



Retraction stop pads on the carriage are being machined



A Giddings & Lewis mill bores gear housings in the carriage



A Mack truck transmission helps with this cradle tube assembly job

IRON ORE SUPPLY*

Total ore carried to last week	54.2
Total ore carried to same week, 1951	73.2

CONSUMED**

Total ore consumed to last week	56.2
Total ore consumed to same week, 1951	68.2

HOW IT LOOKS**

Total ore on hand Dec. 1, 1952	45.5
Total ore needed Dec. 1, 1952-Apr. 1, 1953	32.1
Remaining stocks Apr. 1, 1953	13.4
Stocks Apr. 1, 1952, were	21.4
Stocks Apr. 1, 1951, were	17.3

*All figures in millions of gross tons. **Estimated by STEEL.

Iron Ore: Winter Stocks Adequate?

BLAST FURNACES won't go ore hungry next winter, but cupboards will be uncomfortably close to bare when shipping starts again next April. That probably will mean spot shortages of some types of ore for some firms, but supplemental rail shipments and neighborly lending should keep iron production at full capacity.

Many anticipated ore shortages during the winter that would cripple production when the strike ended. Ore carriers went to work in earnest on the stockpiles they would have been building during the lost two months. During September they moved a record 14.4 million tons and they're shooting at a year's total of 75 million tons when the season ends about Dec. 1.

Good Odds — Probably they'll make it. The Coast Guard is allowing heavier-than-normal loading of ore vessels for this time of year and promises icebreakers if necessary to clear the way during the early part of the winter. Several new ships are in operation which can travel faster and carry heavier loads, and more are about to be commissioned which may make trips yet this year. Turn-around times are being shortened substantially and through-rail shipments are being promoted though less ore is being carried by rail this year than last due to the greater expense.

If the 75-million-ton goal is met, ore furnaces will breeze by with a 13.4-million-ton margin, as shown by the chart. If it isn't met, the surplus will be even less, but increased rail shipments and use of a greater proportion of scrap can be brought into play. Steel plants are less concerned about winter supplies of scrap than they have been for years, and increased scrap use is a strong possibility.

Though the ore picture isn't good, supplies should be adequate.

Firms Plan Tin Can Research

Steel companies are planning to sponsor research projects aimed at finding an economical way to remove tin from used tin cans.

They hope to recover the tin and use the steel in the cans as scrap for their open hearths.

Under the auspices of the Steel Industry Scrap Mobilization Committee two research projects will be started. One, conducted at New York University will be devoted to pyrometallurgical methods. The other will be at Armour Research Foundation and will be concerned with chemical methods of recovery.

Up to a million tons of scrap a year can be recovered from the nation's rubbish dumps if research on the project is successful.

Niagara River Steel Formed

Newly-formed Niagara River Steel Corp. will build a $40.3 million pig iron and coke plant on river front property near Syracuse, N. Y. Included in the facilities will be a blast furnace, power generating equipment, a coke and coke by-product recovery plant and other auxiliary facilities.

The Defense Plant Corporation has authorized the firm to depreciate 85 per cent of the cost in the next five years for tax computation. Directors of the new firm include: George Carvlin, vice president, Koppers Co., Pittsburgh; A. F. Franz, president, Colorado Fuel & Iron Corp., Denver; Louis McLean, Philadelphia investment banker; and Wiley Moor Sr., Atlanta.

90 Necessity Certificates Given

Certificates of necessity for accelerated tax amortization for 90 new or expanded facilities amounting to $130.1 million from Sept.

25 through Oct. 1, were issued by DPA.

Of the 90 certificates issued, 29 are for facilities involving small business, the cost of which is estimated at $42.2 million.

The three largest certificates granted are to American Airlines, Inc., New York, air transportation, $47.4 million, 80 per cent allowed; Niagara River Steel Corp., Syracuse, N. Y., pig iron $40.3 million, 85 per cent allowed; and International Minerals & Chemical Corp., Polk County, Fla., phosphate rock, $7.7 million, 50 per cent allowed.

Including the 90 new certificates, accelerated tax amortization amounting to $22.7 billion has now been granted by DPA for 14,000 new or expanded facilities. Of this amount only 61 per cent or $13.9 billion is eligible for rapid depreciation.

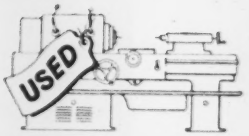
More Small Pipe Must Be Made

A critical need exists for small diameter pipe by crude oil and petroleum products pipe lines. A study of pipe line requirements for the next three years indicates that far more new line pipe from 2 inches through 10 inches in diameter will be needed than has been available in the past.

This was revealed in a report submitted by the Committee for Pipe Line Companies to Petroleum Administration for Defense. J. L. Burke, of Tulsa, Okla., president, Service Pipe Line Co., and chairman of the committee, urges the manufacture of more small-diameter pipe.

Mr. Burke said "a substantially increased percentage of the industry's needs must be met by new pipe; over 50 per cent more 3 and 4-inch and almost four times as much 6-inch must be made available as new pipe in 1952 as was available in 1951, and the need for new pipe will increase in 1953 and thereafter as available take-up and salvage declines."

Requirements for 2 through 10-inch new and second-hand line pipe will rise steadily from 419,939 tons in 1952 to 448,045 tons in 1953, 482,020 tons in 1954 and 514,578 tons in 1955.



Used Machinery:

Fast Market for Old Tools Slows Down

USED MACHINERY dealers are suffering a slight case of sales cramps as their abnormally high sales of last year shrink to more normal proportions. Their business is still healthy but will require some close attention in the months ahead to the spotty softening around the markets.

Key to that tempered prognosis for rebuilders, reconditioners and dealers of used machine tools is the delivery situation on new, domestic tools. Loosening in deliveries of new tools, the amendment to the M-41 machine tool order—allowing unrated orders a place on builders' order boards—and falling backlogs among some machine tool builders are quickly reflected in the used tool market. There's a growing reluctance among manufacturers to invest 70 per cent of the new cost in a used tool.

Importance of Imports—Of less importance, though still in the picture, are high imports of foreign machine tools. For 1951, total dollar value of machine tool imports was $13,703,655. In the first six months, the dollar value of such imports climbed to $25,837,845. Bulk of foreign imports are grinders and lathes, and the least important items include gear cutters. They all relieve some of the pressure for used equipment, says Simmons Machine Tool Co., Albany, N. Y.

Not much of an item in the current market situation, but holding promise of being the biggest headache for used machinery dealers in the future, are government-owned and leased tools. Latest figures show that NPA's Machine Tool Inventory Center has leased 2117 pieces of equipment from May 12 through Sept. 22, 1952. In the pool and available for lease are some 30,000 additional units.

Questionable Operation — The leasing arrangement, while a good one for some manufacturers, has many limitations: Does the manufacturer qualify by being in defense work? Does the pool have the tool he needs? Can he get it when he wants it? Net effect of such limitations is that there are only an estimated 100 pieces of leased equipment in the Cleveland area, for example.

Another factor making it difficult for used machinery firms to operate is more psychological than physical. When price ceilings were instituted on used machinery in October, 1951, the value of many tools went up from what the seller had them on his books for to what the government said they were worth.

Used equipment tended to sell at ceilings at auction sales, too. As long as used machinery firms had to buy tools at ceiling, they couldn't afford to handle them for resale.

Defining Demand—All that does not mean the market for used machine tools is dying. There's still a scarcity of good used tools and an abnormally high demand for certain types of tools like vertical and horizontal boring machines, jig borers, radial drills, turret lathes and surface grinders.

It does mean buyers are becoming increasingly selective as to type and age of used tools. One large automotive firm refuses to look at any equipment built prior to 1942. Large unit sales are disappearing, too. "Instead of selling 10 units in one crack, it now takes 20 calls," comments L. W. Corrigan, Noll Equipment Co., Cleveland.

Reading the thermometer of dollar sales shows an expected $160-million-dollar year in 1952. That's off about 20 per cent from 1951 and even below 1950's $175 million. At that, the case of sales cramps will not be rigor mortis for established dealers.

Operation Bluejay Perches in Greenland Nest after Migration from Virginia

Baffling supply problems were licked by the Air Force's Operation Bluejay which established and supplied new strategic Thule Air Force Base in Greenland. With a friendly boost from 60-ton floating cranes (left), construction equipment, machinery and supplies swing aboard ships like the LSD (Landing Ship Dock) holding dump trucks and piling (right). Following a swift trip from the Hampton Roads, Va., port of embarkation, the material will be put to work in barren Greenland. All the workers and equipment needed by Operation Bluejay had to be shipped in during the summer months because of the ice-bound seas surrounding Greenland the rest of the year.

Accent Shifts to Output in Defense Program

MILITARY PRODUCTION appears certain to change its course in the months ahead regardless of the election results.

Up to now, there's been almost continuous delay in production, cutbacks in schedules and slowdowns caused by design and engineering changes and lack of tooling. Currently, signs denote a new concentration on production in the Pentagon. Even in aircraft where emphasis will still be on design, higher output is expected by sometime in December (STEEL, Oct. 6, p. 47).

Pointers—One signal pointing to the shift is the appointment of Hugh Dean, retired General Motors vice president in charge of production as special assistant to Defense Secretary Robert A. Lovett. Another is the hard try being made to get John Woods of Chevrolet to accept the post as assistant chairman of the Munitions Board in charge of production.

The military has evidenced an intention to hike military set-asides of steel mill products in the second quarter, 1953. That will happen sometime after the Steel Products Industry Advisory Committee meets with NPA on about Oct. 27 at the earliest. NPA directives to the steel mills have made it clear that military set-asides will hold at fourth quarter levels during the first quarter of 1953, with perhaps some minor changes.

Time for Output—Defense Secretary Lovett sees the next two years as a period of mass production now that the tooling job is almost done. Defense Mobilization Director Fowler in his quarterly progress report sees the period as one of expanded opportunity in view of progress made in reaching expansion goals for basic commodities. The Fowler report points out $129 billion is available for military procurement against which $41 billion in deliveries have been thus far received. About $28 billion hasn't been obligated yet.

Expanded Opportunity — Mr. Fowler, who admittedly would like to see the stretchout reversed, sees the completion of the basic expansion program as an opportunity to do a number of things without risk of doing violence to the civilian economy. Among the things he would like to see studied further are: Further build-up of raw material stockpiles, principally of the ferroalloys, and relation of productive capacity for basic materials and finishing capacity needed to process these materials into shapes and forms needed for munitions.

SELECTED DEFENSE CONTRACTS IN EXCESS OF $100,000

PRODUCT	CONTRACTOR
Carbine Racks	Dakin Mfg. Co., Chicago
Rifle Grenade Stabilizers	Slaymaker Lock Co., Lancaster, Pa.
Aircraft Refueling Systems	Kaminer-Helgerson Inc., Greenville, S. C.
Aviation Armament Parts	E. L. Cournand & Co. Inc., New York
Aviation Spares for Maintenance	Vickers Inc., Detroit
Wheel, Brake, Strut Assemblies	Bendix Aviation Corp., South Bend, Ind.
Hoist Assemblies	Redco Lion Cabinet Co., Red Lion, Pa.
Starter Assemblies	Bendix Aviation Corp., Teterboro, N. J.
Boot De-icers and Components	B. F. Goodrich Co., Akron
Generators	General Electric Co., Philadelphia
	Bendix Aviation Corp., Teterboro, N. J.
Overhead Traveling Crane	Harnischfeger Corp., Milwaukee
Engineers Spare Parts	Caterpillar Tractor Co., Peoria, Ill.
Motor Vehicle Parts	General Motors Corp., Detroit
Steam Turbine Refrigeration	James F. O'Neil, New Orleans

NPA Names New Directors

Recent announcements from Washington appoint these men to administrative positions in the NPA. At the left, Bennett S. Chapple Jr., of Pittsburgh, is now assistant administrator in charge of the Metals and Minerals Bureau. Donald M. Pattison, right, will be the new director of the Metalworking Division. He will succeed Ralph Howe. At present Mr. Pattison is director and vice president in charge of sales for the Warner & Swasey Co., Cleveland. Mr. Pattison's appointment is scheduled to take effect on Nov. 1. Mr. Chapple has had 24 years of experience with various steel companies and is now on leave from U. S. Steel Corp., where he is assistant executive vice president, commercial. He will head a bureau composed of six operating divisions, including all metals and minerals. He succeeds William M. Day, Detroit

CHECKLIST ON CONTROLS

Materials Orders

OIL, GAS INDUSTRIES—Direction 2 and Direction 3 to NPA Order M-46 were revoked Sept. 30, 1952. Direction 2 refers to assistance for small producers, and Direction 3 refers to filing date for applications on Form PAD-26LP for fourth quarter, 1952, requirements of line pipe.

TIN PLATE, TERNE PLATE—Amendment of Oct. 2, 1952, of NPA Order M-25 gives users of tin plate greater freedom in the use of that product and eliminates all restrictions on the use of terne plate. It was effective Oct. 2.

BRASS—Amendment of Oct. 2, 1952, of NPA Order M-82 removes the restriction preventing a distributor from selling more than 2000 pounds of brass mill products on any one sale without specific authorization from NPA. It also provides that no distributor shall be required to accept an authorized controlled material order for more than 2000 pounds unless otherwise directed by NPA. Previously the figure was 500 pounds. The amendment was effective Oct. 2.

ALLOYING MATERIALS — Amendment of Oct. 3, 1952, of Direction 1 to NPA Order M-80 and Schedules 1, 2, 3, 4 and 5 changes the allocation of alloying materials from a monthly to a quarterly basis. Applications for delivery and authorization for use of these materials during first calendar quarter, 1953, must be filed on Form NPAF-114 on or before Dec. 7, 1952. Amendment was effective Oct. 3.

COBALT—Amendment of Oct. 3, 1952, of Schedule 2 of NPA Order M-80 removes the prohibition against use of cobalt and cobalt derivatives in the production of porcelain enamel signs.

Controlled Materials Plan

CONSTRUCTION—CMP Regulation 6, revised through a series of NPA actions effective Oct. 3, 1952, will increase on May 1, 1953, the amounts of controlled materials that may be self-authorized for commercial and most other types of construction, as well as lift the ban on recreational construction. Direction 8 to Regulation 6 was issued, Direction 2 to Regulation 6 was amended, Direction 5 to Regulation 6 was amended, Delegation 14 was amended and NPA Order M-100, the housing order, was revoked and its provisions incorporated in Regulation 6.

Price Regulations

TRANSPORTATION COSTS—Supplementary Regulation 122 of General Ceiling Price Regulation, Supplementary Regulation 35 of CPR 22 and Supplementary Regulation 9 of CPR 30, all issued and effective Oct. 2, 1952, provide adjustment procedures by which certain manufacturers who sell on a delivered-price basis may increase their ceiling prices to reflect higher outbound transportation costs.

COKE—Amendment 11 of Supplementary Regulation 13 of General Ceiling Price Regulation, issued Oct. 2, 1952, authorizes sale of coke with provision for adjustable pricing for 45 days, pending completion of an agency survey of the industry to determine whether there is need for ceiling adjustment. Amendment is retroactive to Sept. 29 and expires Nov. 12, 1952.

MACHINERY, RELATED GOODS — Supplementary Regulation 8 of CPR 30, issued Oct. 2, 1952, and effective Oct. 7, extends the provisions of Section 402 (d) (4) of the Defense Production Act of 1950, amended, to manufacturers of machinery and related manufactured goods and suppliers of services covered by CPR 30 who determine their ceiling prices by a price-determining method or pricing formula.

BRAND NAMES — Amendment 4 of Oct. 1, 1952, of Supplementary Regulation 4 of CPR 7 grants an extension of time, until Jan. 2, 1953, for certain special orders establishing uniform resellers' ceilings for manufacturers or wholesalers of brand-name articles who establish such ceilings under Section 43 of CPR 7.

FILING PROCEDURES—Amendment 36 of General Ceiling Price Regulation, effective Oct. 11, 1952, authorizes local OPS offices to receive and act upon reports of ceiling prices on new commodities and services and applications from new sellers.

AUTOMOTIVE—Amendment 5 of Revision 1 of CPR 1, effective Oct. 8, 1952, specifies in greater detail the information required by OPS in an application for ceiling prices on a new line of automobiles and provides for the use of OPS Public Form 149 in applying for establishment of ceiling prices on new extra, optional or special equipment.

REPAIR PARTS—Supplementary Regulation 36 of CPR 22 and Amendment 56 of CPR 22, effective Oct. 13, 1952, permit manufacturers of assembled articles who make their own repair and replacement parts to increase the ceiling prices of their parts to reflect post-Korea cost increases.

Appointments in Washington

Harris Bateman was appointed director of the Materials Division of the Petroleum Administration for Defense, succeeding Richard M. Morrison.

Harry L. Erlicher was named an alternate member of the Defense Production Awards Council of the Department of Defense.

Yngvar Brynildsson is now deputy administrator of the Small Defense Plants Administration.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

A CIO idea may be applied to price controls by OPS Boss Woods, who used it when he was rent controller. It's local housewife committees to help enforce federal edicts

INTENSIFICATION OF THE fight for their financial lives faces thousands of manufacturers and retailers.

OPS' obduracteness in refusing to grant price increases adequate to cover increased material and labor costs may prove mild compared to the latest idea cooked up by a government planner.

Housewives' Gestapo—Tighe E. Woods, new OPS administrator, proposes to add an idea whose initiation is widely credited to the CIO and which was first used in enforcing rent control laws. It entails the appointment of local committees of housewives authorized to enforce the price control powers of OPS on a local basis.

The eminent unsuitability of politically appointed women with new-found authority will be learned soon enough. Judging from the experience under rent control, they will be unduly worried about profits earned by department stores and food merchants. Carried to its logical extension, a march of committee members on every nut and bolt and other metalworking factory with picket lines to force lower prices is even a possibility.

Ignored Lesson—What actually happened under rent control and the vigilante committees? For one thing, rent control drove thousands out of the landlord business. Census Bureau figures report 523,000 fewer rental housing units in 1950 than in 1940 despite the fact that in that decade 923,000 new rental housing units had been built. There was a net loss of nearly 1,500,000 rental housing units in the decade.

The second lesson: Federal officials do not give up controls without a determined struggle, despite the will of Congress. As of Sept. 30, many cities elected to continue rent control over another nine months, but an almost equal number voted to end rent control. Then what happened? The interdepartmental Defense Area Committee declared many of the latter cities particularly those that are strongly unionized like Evansville, Ind., Akron, Allentown, Pa., etc. to be critical defense areas. The result was to clap rent control back on these cities *despite the decision of their governing bodies!*

Tight Fingers—Doubts are expressed whether the OPS is in earnest when it talks about not maintaining controls for controls' sake. Despite promises to unfreeze items as fast as need for continued control is shown to be unnecessary, representatives of the National Retail Dry Goods Association recently were turned away when they demonstrated to OPS that their price order CPR 7 was no longer necessary.

They showed all consumer goods are in adequate supply and most of them are selling below the ceiling prices. Compliance with the order is needlessly costing the retailers millions of dollars a year, but all they got was the indefinite assurance that individual items would be freed when the "time was right."

The Fight Is On—It is not too much to say that manufacturers and retailers are in a fight for their financial lives. Many are already feeling the pinch. Bear in mind that under the present setup the only medium for obtaining relief is Congress.

Now is not too soon to launch a campaign to terminate the whole price control program next year. At least it must be whittled down to its essentials.

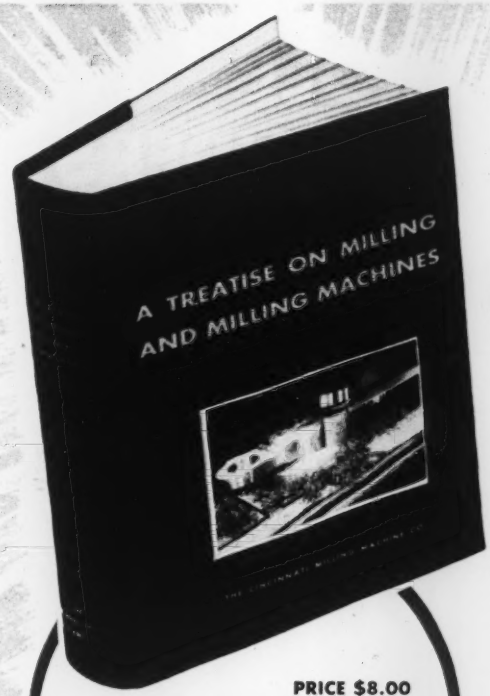
Ruptured Duck Dept. . . .

First over-all decrease in civilian employment by the government in more than a year occurred in August when the federal payroll sustained a net loss of 9032 names, according to the regular monthly report of the Byrd Joint Committee on Reduction of Nonessential Federal Expenditures.

But the federal payroll at the end of August numbered 2,590,091 persons and no great curtailment in federal civilian employment is expected as long as the Russian menace continues. Civilian employment in the military establishment is the big factor, numbering 1,334,415 at end of August.

Farm Circuit Lengthens . . .

More than 200,000 farms were electrified in fiscal 1952. On June 30, 4,740,849 farms were connected to power lines, leaving a total of 641,285 still unelectrified. That makes a total farm electrification of 88.1 per cent as of June 30, 1952, as compared with 84.2 per cent a year previous.



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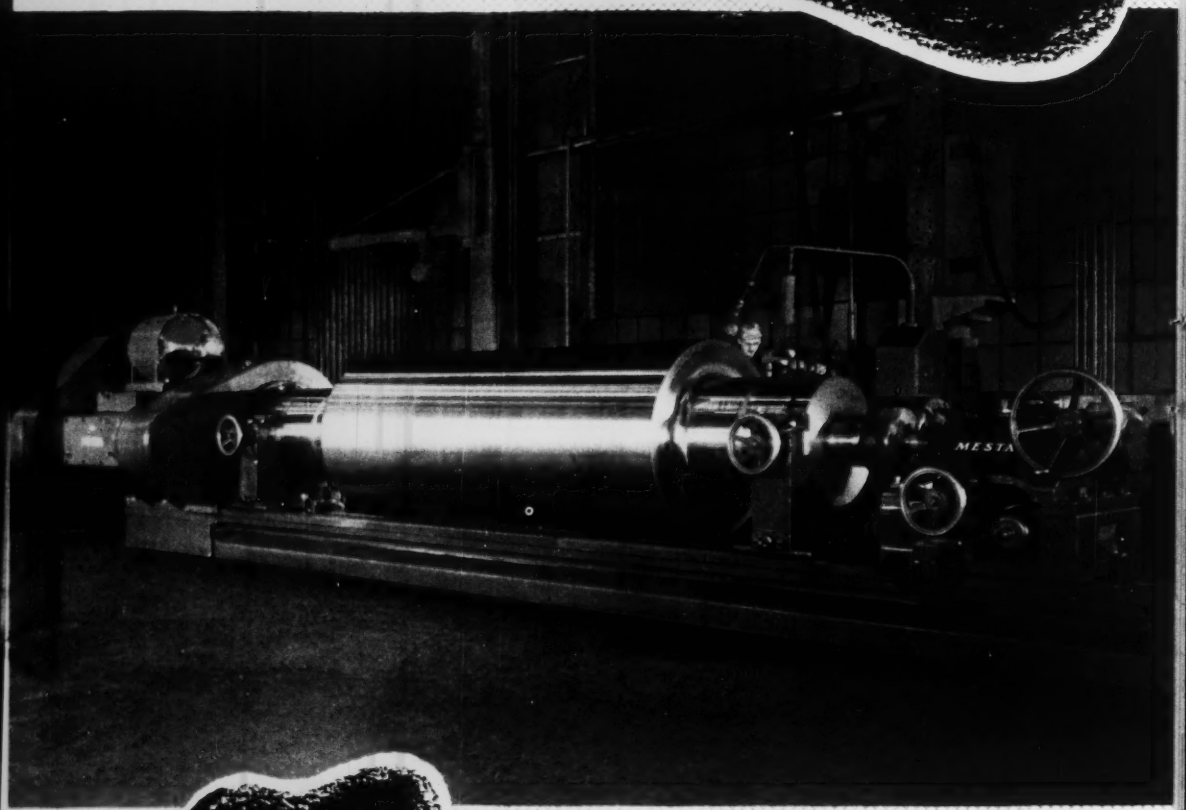


Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY
Pittsburgh, Pa.

PAD Attacks Shortage

By helping foreign producers to boost output, PAD hopes to ease pipe shortage in U.S.

THE PETROLEUM Administration for Defense is attempting to ease the pinch for oil country tubular goods—casing, tubing and drill pipe—for domestic users and give a boost to foreign producers at the same time.

PAD will try to do it two ways: Give foreign producers advanced information through the Mutual Security Agency as to 1953 tubular goods requirements of foreign oil and gas producers as well as the size pattern of U. S. and Canadian operators who require more tonnage than can be supplied by U. S. mills; and hold order books of foreign mills for any period open to only foreign operators for an initial 30-day period, after which U. S. operators would be permitted to place orders. PAD, at present, is only "exploring" the feasibility of the latter plan.

Casing the Problem — The idea is to divert oil companies operating abroad to foreign mills, reducing the drain on domestic supplies, and yet permit U. S. operators to supplement domestic purchases with foreign casing and tubing.

Some foreign mills are operating on only one shift. Higher output on long-term production schedules might reduce unit prices, which are now much higher than American-made products. PAD estimates European and U.K. mills will produce 250,000 tons of oil country tubular goods this year. That's almost double the estimated 170,000 tons produced by those mills in 1951. But, it's still not enough, says PAD.

Requirements of oil and gas operators for oil country tubular goods outside the U. S. and Canada in 1953 are estimated by PAD at about 240,000 tons, and 1953 needs for Canada are estimated at about 150,000 tons.

Scrap Export Quotas Set

Export of iron and steel scrap will be permitted in the rest of 1952 only under specific hardship conditions, says the Office of International Trade. Licensing of the regular third and fourth quarter, 1952, scrap export quotas has already been completed. The quotas are 36,000 tons for each quarter.

Hardship conditions result when scrap, including material in U. S. territories, cannot be sold in the U. S. at a reasonable price and causes economic distress to the holder. Application to export such material must be certified to the director of the Steel Division, NPA, as to: Length of time the scrap has been held and names and addresses of potential buyers to whom the scrap has been offered, together with the sale prices and reasons the offer was rejected. U.K. buyers will get first call on any scrap certified by NPA as "distressed," says OIT.

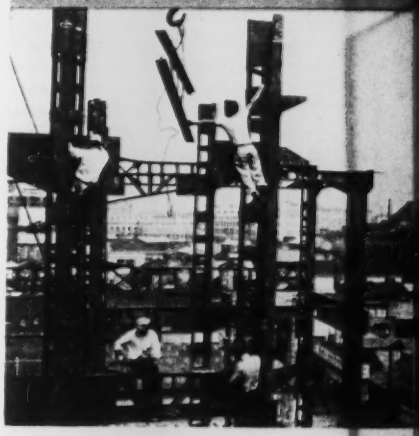
German Exports Soften

Some German steel processors are meeting stiff competition in the export market. Cutlery exports, which amounted to 70 per cent of production in pre-war times, have declined to 35-40 per cent now. The same is true for hand tools of all sorts. Only the machinery industry whose turnover has reached about 850 million deutsche marks monthly—of which 260 million deutsche marks are for export—isn't weakening.

TOKYO HAS ANOTHER BOOM

Tokyo is in the midst of its second reconstruction boom (the first followed the Great Earthquake of 1923). In the spring of 1951, there were 50 new buildings being erected in the central area of the city alone.

That building boom is reaching even higher levels now. Construction includes many fashionable new reinforced concrete buildings and seemingly is going on in all directions of Tokyo. A member of the Philippine delegation recently sent to Tokyo to discuss Japan's reparations obligations remarked, "If the Japanese can afford to build such lavish buildings in such increasing numbers, they can certainly afford to pay all their reparations to the Philippines."



Construction of the Kyowa Bank building begins (above) as the Tekko building nears completion. While no skyscrapers are built in Japan, four workers (center) on Shinko Rayon Co. building are at dangerous altitudes. Workmen prefer to carry their loads to upper stories via wooden foot-paths (bottom) but conveyors are available

Black Star

Parking Meters

Coin Machines Hold a Jackpot

Demand for new units holds high but won't last forever. Then replacements should keep business strong for some

THERE'S A JACKPOT in parking meters—not for the motorist and his vanishing buffaloes, but for the communities that use them and for the manufacturers who supply them.

Sales of the coin-operated hitching posts have held steady or increased over the past three years for meter manufacturers and estimates of the industry's income for this year average $9 million with one estimate of $13.5 million.

Manufacturers All — With the diverse requirements for stampings, screw machine products, die castings and other parts, few of the half-dozen or so parking meter firms make all of their own components but several make a majority. The meters are then assembled in the parent plant and packaged for shipment.

Of the three basic operating components—signal, timer and setting-mechanism—the timer is most complex and expensive. The timers on manually operated parking meters can be likened to an alarm clock, although fewer parts are used. The timers on automatic meters are more complex, like an eight day clock which must be wound by a city employee to keep it in operation. Timer units must be designed and built for extremely rugged service subject to extreme temperature variation, and though movements for most parking meters are basically the same as three years ago, considerable simplification with resultant reliability is under way. One firm reports that its newest model contains 16 less parts, eliminating 32 manufacturing operations.

Cost—Like other manufacturers, the parking-meter makers have been plagued by shortages of critical materials and rising costs. Most parking meters today cost $50 to $75 per unit, five to ten per cent more than in 1949, but the increased tab hasn't hurt sales, say the manufacturers.

"New installations are running about 80 per cent of current business," says G. A. Hale, president, Magee-Hale Park-O-Meter Co., Oklahoma City, Okla., "more than most of us had hoped for." Dual Parking Meter Co., Canton, O., cites an increase in metered off-the-street parking as one factor responsible for the high levels of new installations.

Lemons?—The jackpot may be drawing to a close as each year the replacement of old parking meters becomes a greater proportion of business, but the expected saturation of new installations is still in the future. When it comes, total volume will probably be reduced to about 50 per cent of present levels and competition will become more keen.

But parking meters are here to stay. In addition to the cities' yearly $75 per meter revenue (exclusive of ticket gouges), turnover of parked cars in congested areas has been facilitated by parking meters. That adds up to a jingling future for the parking-meter makers.

Small Plants Have Big Plans

Small steel companies are carrying their weight in the nation's industrial expansion program, experts believe.

An American Iron & Steel Institute survey of 25 companies with 175 to 3900 employees shows they expect their steelmaking capacity to increase 50 per cent between Jan. 1, 1951, and January, 1953. The entire industry anticipates a gain of 12 per cent during a similar period.

As a group, the 25 companies will have a 6.8 per cent share of the total national steel capacity in 1952, compared with 5.1 per cent in 1951. While realization of plans depends on swift recovery from the steel strike, three companies will have expanded by more than 90 per cent since 1940 on completion of present programs. Four companies with no steelmaking facilities in 1940 will have a combined capacity of 870,000 tons by the start of next year.

Manganese Supplies Still Firm

Developments in foreign markets indicate the U. S. will continue to enjoy sufficient quantities of the essential steelmaking element, manganese. Increased trade with Africa, Asia and Latin America should solve the problems of American industry, which must import 90 per cent of its manganese.

When Russian exports of the vital element dwindled in 1949, the U. S. cast an anxious eye over the foreign market. Success at finding new sources is shown by record imports in recent years: 865,000 tons in 1950 and slightly less in 1951.

India is now the most important exporter of manganese. The Union of South Africa is the second largest source—rapid development for a country which exported a little manganese 15 years ago. Other friendly countries exporting manganese include Cuba, Brazil, the Belgian Congo and Angola.

Mullins Builds Extrusion Plant

Mullins Mfg. Corp., Salem, O., will establish a plant for the cold extrusion of commercial items in steel under its Koldflo process. Cost of the new facility, to be part of its main Warren, O., plant, will be $2.6 million. In addition to the two 2000-ton presses already installed in the Warren plant, Mullins will buy four more 3000-ton presses with 36-inch strokes. This equipment will enable the Koldflo

Division to cold extrude steel products up to 30 inches in length and weighing 50 pounds. A building with 20,000 square feet of floor space will be erected adjacent to the main building to house bonderizing, pickling, annealing and sawing equipment needed in the cold extrusion process.

Mullins already has a cold extrusion operation for the military. Its partially-completed Liberty plant, also located in Warren, is mass-producing shells by the extrusion process.

Pressed Steel Adds Two Firms

Pressed Steel Car Co.'s pending acquisition of Axelson Manufacturing Co. and Umpqua Plywood Corp. is the latest step in its diversification policy to level off extreme fluctuations in carbuilding.

Axelson stockholders voted on the acquisition Oct. 8, and completion of arrangements with the Umpqua company are expected within the next 30 days.

According to contract terms, Axelson shareholders will receive 1.18 shares of Pressed Steel common stock for each share of Axelson they hold. Pressed Steel's transaction with Umpqua will involve over $2 million in cash.

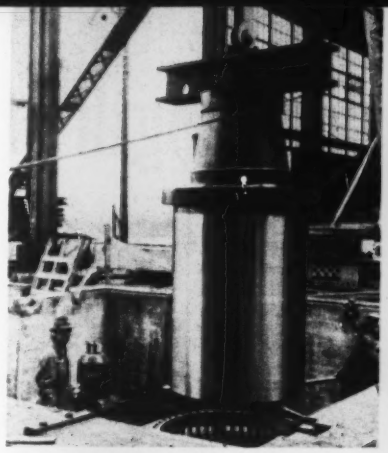
Since 1949 Pressed Steel has acquired five steel fabricating companies in industries producing products other than freight cars. Formerly, freight cars represented almost 100 per cent of the company sales, but will now be reduced to less than 50 per cent.

Warehouse Space Declines

The nation's storage space has shrunk during the past ten years, but space demand has risen with increases in population and national inventories.

That's shown in a survey conducted by the Defense Transport Administration. Replies came from 2749 warehousings concerns.

The survey states that as of Oct. 31, 1951, total net occupiable piling space used for storage of general merchandise and household goods was 130 million square feet. Total net space for general merchandise was 90.8 million square feet. More than 72.5 million square feet was occupied.



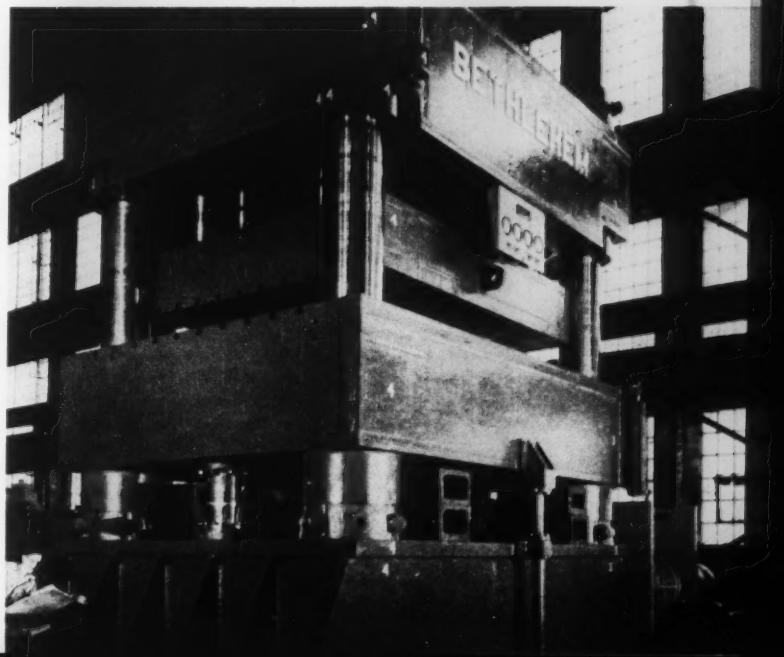
When Standard Railway Equipment moved to Indiana, the 4000-ton press was a real problem. Piece by piece, it was moved to its new home and installed, above

Entire Industrial Plant Moves West

Persons inquiring in New Kensington, Pa., for the Standard Railway Equipment Mfg. Co., would be wise to look two states to the west, to the company's new home in Hammond, Ind. A manufacturer of railroad car roofs and other parts for 43 years, Standard Railway Equipment's New Kensington branch moved in order to slice freight rates by being nearer its steel supply.

Residents Regretful — Residents watched wistfully as the company, which had employed 475 men and had annual production totals of $5 million during the early 1940's, dismantled its machinery. When economic conditions dictated the move, company officials called on F. H. McGraw Co., Pittsburgh industrial plant movers, to transport the equipment. McGraw used 300 freight cars for the $3½-million transfer. Among the equipment was the 4000-ton press shown here.

Below is the press, completely installed in the new Hammond, Ind., plant. It was made for National Railway Equipment by Bethlehem Steel Co., Bethlehem, Pa.



When a high-strength steel is needed

for severe cold-formed shapes like these bumpers

Specify → **N-A-X** HIGH-TENSILE STEEL

and get all of the requirements of SAE 950

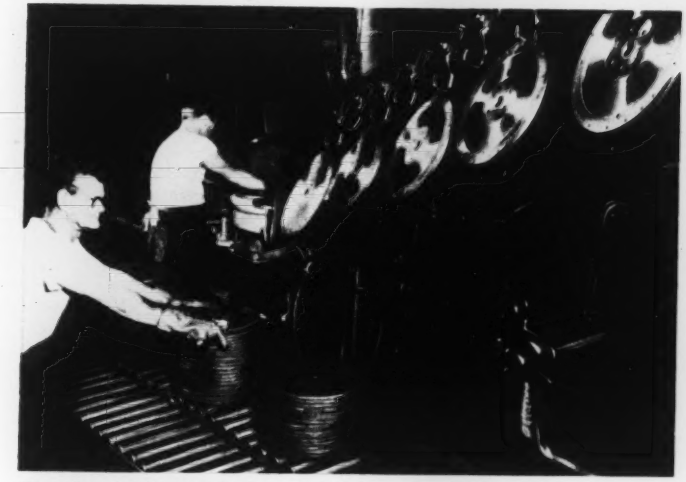
When a material meeting the requirements of the high-strength, corrosion-resisting steels of SAE Specification 950 is used for severe cold-formed shapes, it will pay to investigate N-A-X HIGH-TENSILE steel—the low alloy steel with *built-in formability*. Its finer grain and higher hardness also result in brighter luster when ground and polished for plated parts.

GREAT LAKES STEEL CORPORATION
N-A-X Alloy Division
Ecorse, Detroit 29, Mich.

NATIONAL STEEL CORPORATION

By H. C. TUTTLE Detroit Editor

Mirrors of Motordom



Flywheels Fly Off Production Line

Soaring off the production line are these steel flywheels at the Hudson Motor Car Co., Detroit. Note the use of overhead and roller conveyors in bringing materials to a pair of workers. The highly-polished flywheels shown in the above photograph will eventually function within Hudson's fluid-cushioned clutches

Manpower, not materials, is fast becoming the limiting factor in Detroit production. By early 1953 the shortage is likely to equal that of World War II

DETROIT

BY MID-JANUARY the automotive industry is expected to be hard against a manpower shortage which will rival that experienced at the peak of World War II.

The storm warning flags are starting to fly already. No less than half a dozen car makers now have production limited more by labor supply than by materials supply. And yet many defense contracts are still in the tool-up stage and a considerably higher level of automobile production is desired. Industry men and observers are starting to ask: "How can we have fuller than full employment in the future?"

No Rosie Riveters—The problem is not one with an easy solution. The people who blithely think that all that's needed is for Rosie the Riveter to come back to work haven't been in many plants lately. Rosie, in many cases, never went home. And when she did more often than not she filled her house with kids. The attraction which the auto industry used to have for southern workers also has lost much of its glitter since the South began its industrial revolution. The Southern Paducah's are holding their own and seeking more people. The hot breath of the draft keeps many young men in school who might otherwise be tempted into filling the available industrial vacancies.

A few auto plants are now fairly well staffed for their dual role. One such is Kaiser-Frazer which conducted an intensive recruiting drive throughout the summer. It had the advantage of having a head start, defensewise, on many of the other automakers, but even it is running ten-inch ads daily in search of skilled and semiskilled workers.

Always Acute—The shortage of craftsmen has been extreme. Last winter when unemployment in automaking centers in Michigan was a national problem the highly skilled had no difficulty getting a pick of jobs. Now the shortage of help extends to inexperienced and break-in workers and the "inventory of openings" cataloged by the Michigan Employment Security Commission lists hundreds of jobs for laborers.

Right now, says MESC, Michigan's key industries have developed "the strongest demand for labor since the record production push of late 1950. Demand for manpower by plants in Detroit, Flint, Saginaw and many smaller Michigan areas has virtually exhausted the supply able to meet employers' "hiring standards." Manufacturing employment in metropolitan Detroit in mid-September was about 38,000 higher than it had been in the middle of August and was over 150,000 more than it had been in mid-July during the steel strike. How strong the upward trend is can be learned with some certainty from the reports on planned hirings which companies give MESC. By mid-November, according to this projection, Detroit area manufacturers will want 23,000 more workers for a total of 697,000 and by mid-January their goal is 710,000. This will bring the pool of unemployed below the irreducible minimum level, it now appears.

More Trouble—It is not strange, therefore, that labor trouble is on the upswing, nor that pirating and hoarding are frequently used words. These symptoms of the underlying problem, and the growing manpower shortage itself, have made reactivation of the long-dormant government-sponsored labor-management committee in Detroit necessary. Representatives of labor unions, industry and the public, chairmanned by MESC's Director Max M. Horton, will hold their first meeting since January today. This group will be seeking means whereby fair distribution

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of workers can be accomplished by voluntary programs.

To keep the shortage from putting a serious crimp in automotive and defense production some companies are heeding the advice that the hiring standards should be lowered and undoubtedly more jobs will be opened up to women than are now available. Additionally many companies no longer look on middle age as a handicap. Some are taking in men retired by other firms. There are ways around the skilled manpower problem which many companies would do well to take: Simplify the jobs so that only one setup man may be required for several machine operators, plan on over-time beyond that now worked, install labor saving equipment wherever feasible. Not so easy to accomplish but probably to become badly needed are new production standards which will give management more of the benefits of its machinery.

Output Miracles Go On

While the personnel and industrial relations men try to work out some solution to the manpower dilemma, the procurement and production men daily perform their miracles. Wherever materials are sold to the automakers the supply line is growing so taut it seems on the verge of breaking.

Take the case of the parts supplier who last week received a telegram from a large automaker asking for shipment in two days of a part which had not yet been ordered and whose blueprints he had not yet seen. Or the plater whose supply of nickel anodes has repeatedly been measured in hours.

Speaking only semi-facetiously one supplier says the industry has gone crazy. The valve maker who asks what the car makers are doing for steel forgets for a moment how he managed to meet a production schedule which he earlier said was impossible. And one of the toughest chewing-outs a traffic manager ever got sizzled the long-distance wires out of Detroit recently after the man redirected a shipment over a day-longer route.

This month is expected to see more passenger cars come off U. S. assembly lines than have been built since May, 1951. Truck production will also better the best month of more than a year. Model changeovers will take their toll throughout the rest of the year, to create short-lived dead spots in the production picture, but never before have such extensive changes been made on the run with so little down time. Most of Chrysler's changeover has now been accomplished and it will be in full swing in all divisions toward the end of the month. It has a lot of catching up to do if it wants to take the No. 2 producer spot back from Ford. Chrysler now is about 13,400 passenger cars short of the Ford plant's nine-month total.

Auto, Truck Output
U. S. and Canada

	1952	1951
January	409,406	645,688
February	467,691	658,918
March	517,207	792,550
April	576,505	680,281
May	546,673	695,898
June	560,947	623,682
July	246,461	522,858
August	293,722	571,442
September	593,000*	505,758
October		558,971
November		480,199
December		402,729
Total		7,179,161

Week Ended	1952	1951
Sept. 6	111,095	103,224
Sept. 13	137,295	136,150
Sept. 20	147,748	135,015
Sept. 27	142,893	113,973
Oct. 4	138,000	112,868
Oct. 11	140,000*	120,543

Sources: Automotive Manufacturers Association, Ward's Automotive Reports. *Preliminary.

What Europe Offers

Many members of Detroit's automotive engineering fraternity took a busman's holiday the other evening to see what the European industry has to offer. Their guide was Chevrolet's recently appointed director of research and development, Maurice Olley, a veteran of 40 years in the British and American automobile industry, his previous job having been engineering consultant for Vauxhall Motors Ltd. of England. The Detroit section SAE meeting had a feature which surprised even Mr. Olley—a display of 16 late-model foreign cars loaned by American firms which are dissecting them with an eye to incorporating some of their engineering and styling features.

"The principal thing we can learn from European cars," said Mr. Olley, "is a method to get the weight back where it belongs." The front-wheel-heavy American cars lack the good road-holding qualities of European designs. "Our primrose path here is leading us to larger and larger cars with power steering, power breaking, motor operated window lifts, motor operated seat adjustments, enormous automatic transmissions which require still larger engines and larger gas tanks and so on in the general direction of more and more of everything."

It is not Mr. Olley's contention either that American designers should wholly adopt European ideas or that the Europeans should follow our lead. The differences in needs between various countries make such aping nonsensical. Some of the European suspension ideas should stimulate American thinking, as may the use of aluminum for engine blocks and such parts as windshield pillars. The diesel powered passenger car, Mr. Olley believes, can cut out a niche for itself all over the world. Another motive power which will bear watching is the gas turbine. Though fuel consumption remains a bad feature on the English Rover, this maker, according to Mr. Olley, has been able to get power equivalent to a 100-hp engine with torque converter and 12 mile-per-gallon economy with its car. Consumption of fuel in traffic is "outrageous," he said.

Texas Plant Goes Civilian

First true "dual purpose" plant along the lines conceived by General Motors' C. E. Wilson is that being built by Buick-Oldsmobile-Pontiac Assembly Division at Arlington, Tex. Its first military assignment was to have been a newly designed Grumman plane for the Navy. But ten days ago the Navy changed its mind, leaving B-O-P's general manager to announce in haste that the dual purpose plant will be twice as much as a civilian plant. The plant will be completed on schedule, Mr. James L. Conlon says, and will begin passenger car assembly early next fall.

Latrobe to Display Mammoth Bar of High Speed Steel

New Development to be Featured at A. S. M. Show

Latrobe Steel Company, well known producers of quality tool steels, will exhibit at the Philadelphia A. S. M. Exposition (October 20-21) a bar of "DESEGATIZED" high speed steel — 10 inches in diameter and 10 feet long, weighing approximately 3,000 pounds.

This is the largest bar of high speed steel ever made and is free of carbide segregation throughout.

Carbide segregation and its harmful effects have long been a problem in the manufacture and heat treatment of high alloy tool steels. Latrobe Steel Company, who introduced "DESEGATIZED" high speed steels and high carbon-high chromium die steels in 1946, states that it is now possible to manufacture sizes free of carbide segregation to meet any current and foreseeable needs for these steels.

"Our railroad bridge is an

EYE OPENER

for anybody with an assembly problem"

"Whether you're assembling toasters or bridges," Ken went on, *"it pays to set your sights on fasteners."*

"Fasteners?" asked Jack.

"Right!" affirmed Ken. *"We've saved plenty by taking the RB&W man's advice to switch from rivets to high strength RB&W bolts in assembling high stressed structural joints.*

"These bolts stay tight and that saves us maintenance. They assemble faster, and that saves us labor and construction time."

There's a cost-cutting lesson for you in this story, whatever your industry.* So look to your fasteners for an often overlooked opportunity to reduce costs, and strengthen your competitive position. New inventions, like RB&W's SPIN-LOCK Screw, may prove more efficient than the fasteners you're now using.** Or you may save by the stepped-up production you get from using the finest fasteners... RB&W bolts, nuts, rivets and screws of uniform accuracy, dependability and physical properties.

Let RB&W help you make the most efficient use of fasteners on your assembly line. Address RB&W at Port Chester.

RB&W—The Complete Quality Line. Plants at: Port Chester, N.Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices: Philadelphia, Pittsburgh, Detroit, Chicago, Dallas, San Francisco. Sales agents: Portland, Seattle. Distributors from coast to coast.

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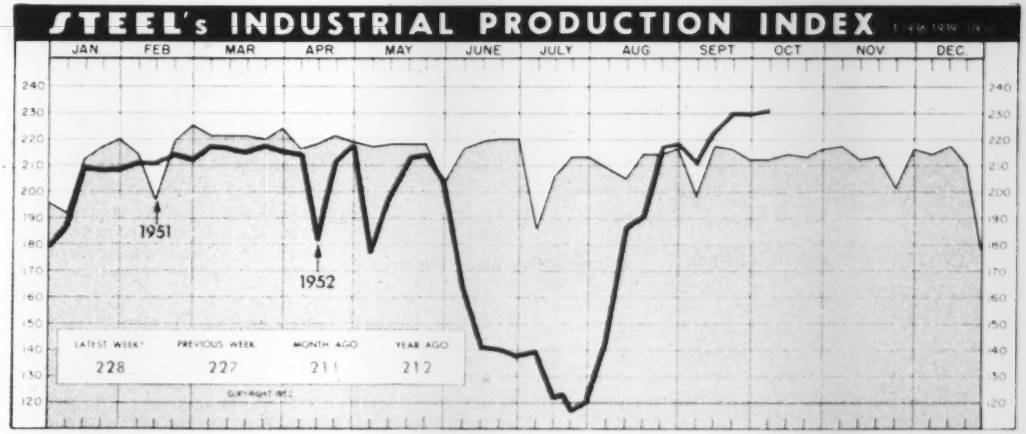
**New SPIN-LOCK Catalog is in the Product Design File. Write for extra copies.



Industrial activity index continues upward at levels well above last year's peaks. Consumer goods producers shift into higher gear as steel breaks all output records

THE business bustle continues unabated. Electric power, automobiles and appliances all add their bit to the flurry of activity, but the main stimulant is steel.

As a partial reaction, Mr. John Doe Consumer has shaken off his lethargy and is exhibiting less reluctance to buy. Total consumer credit outstanding hit a record high of $21.3 billion after U. S. consumers went $173 million further into debt in August, says the Federal Reserve Board.

Inching Upward — Adding the gains in basic steel production to already high activity elsewhere, STEEL's industrial activity index moved up 1 point to 228 per cent of the 1936-1939 average in the week ended Oct. 4. The chart above shows the current level of activity is higher than at any time last year.

Expected to maintain the index at above-1951 levels for the rest of the year are electric power output, which is entering its peak season, and auto production, as the carmakers race to make up for time lost during the steel strike. Currently, however, it's the flow of steel in quicker-than-expected time and in unprecedented amounts which is providing the sustaining force for business activity.

Steel Output Sets Records . . .

The steel industry is racking up new records and near records for production in an effort to catch up on output lost during the steel strike. U. S. plants turned out 2,173,000 net tons of ingots and steel for castings in the week ended Oct. 13, says American Iron & Steel Institute. That would be an all-time weekly high were it not for a record-smashing 2,195,000 tons produced in the previous week.

Automakers Begin Sprint . . .

Automakers will be shooting-the-moon in fourth-quarter production this year. Turnout will be over the 1952 peak of 1,204,678 for the April-June period and probably somewhat under the fourth-quarter record of 1,668,219, set in 1950.

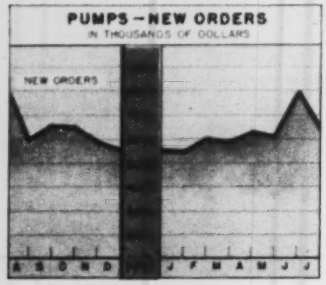
If all goes well, 500,000 passenger cars will leave U. S. assembly lines in October, high point for the last 16 months, says *Ward's Automotive Reports*. Although the nation's car output dipped in the week ended Oct. 4 to 100,148, down 3777 units from the previous week, Chrysler Corp. is emerging from its 1953 changeover and should set a blistering pace for the remainder of the month. All other carmakers bettered their year ago output for the comparative week which totaled only 84,006 units in 1951.

Truck production is expected to hit a near-record volume in fourth quarter of better than 300,000 units, with 123,000 units projected for assembly during October. Surprise package for truck builders is the booming sales of heavy trucks in the 19,501-lbs-and-over class. Such models currently hold 4.7 per cent of 1952 domestic truck shipments, marking consecutive gains since 1949 when the share hit the all-time low of 1.5 per cent.

Total U. S. and Canadian output in the week ended Oct. 4 was 138,337 cars and trucks. That's under last week's total of 141,228 units, but well above the year ago figure of 112,868 units.

TV Production Climbs . . .

TV production in August eclipsed year ago output like a 17 inch screen overshadows a 10-incher, while radio output lost ground slightly. Radio-Television Manufacturers Association reports 397,-

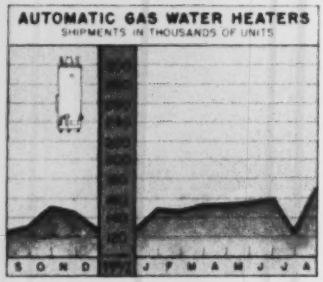


Pumps, New Orders

In Thousands of Dollars

	1952	1951	1950
Jan.	5,517	6,477	2,586
Feb.	6,020	6,480	2,938
Mar.	5,925	7,654	3,313
Apr.	6,334	7,583	3,376
May	6,140	6,371	3,668
June	7,957	6,852	4,153
July	6,299	8,358	4,080
Aug.	.....	5,911	6,429
Sept.	.....	6,552	5,191
Oct.	.....	6,506	4,985
Nov.	.....	5,998	5,961
Dec.	.....	5,553	6,720
Total	.....	80,175	53,400

Hydraulic Institute.

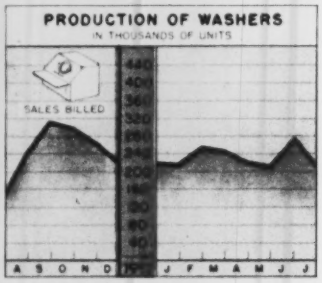


Automatic Gas Water Heaters

Shipments in Units

	1952	1951	1950
Jan.	148,700	225,600	131,600
Feb.	145,800	213,400	156,500
Mar.	153,300	223,300	172,800
Apr.	153,300	199,400	176,400
May	155,300	167,400	195,200
June	159,000	131,500	207,100
July	121,800	102,400	197,500
Aug.	168,000	124,400	259,800
Sept.	.....	136,900	222,600
Oct.	.....	148,800	235,100
Nov.	.....	143,400	206,000
Dec.	.....	127,200	202,500
Total	.....	1,931,200	2,363,100

Gas Appliance Mfrs. Assn.

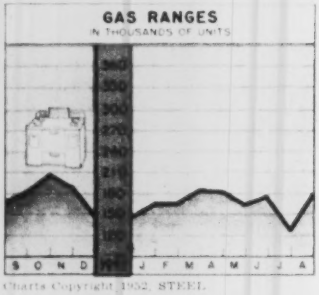


Household Washers

Sales Billed—Units

	1952	1951	1950
Jan.	213,998	321,092	275,576
Feb.	255,864	341,328	342,967
Mar.	248,431	368,455	423,892
Apr.	217,211	292,193	333,072
May	213,668	253,942	304,640
June	274,457	253,119	325,217
July	207,593	139,779	282,261
Aug.	.....	239,081	381,452
Sept.	.....	313,756	424,043
Oct.	.....	297,210	439,924
Nov.	.....	262,484	379,964
Dec.	.....	218,664	377,013
Totals	.....	3,301,123	4,289,931

American Home Laundry Mfrs. Assn.



Gas Ranges

Shipments in Units

	1952	1951	1950
Jan.	166,100	260,600	165,000
Feb.	166,200	254,000	209,000
Mar.	185,200	289,800	264,000
Apr.	182,300	225,000	239,100
May	162,800	177,800	242,800
June	175,700	128,500	217,000
July	124,500	116,400	254,800
Aug.	179,000	168,100	331,500
Sept.	.....	183,600	287,000
Oct.	.....	210,000	308,000
Nov.	.....	192,200	269,100
Dec.	.....	145,800	235,900
Total	.....	2,348,900	3,023,200

Gas Appliance Mfrs. Assn.

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Issue Dates on other FACTS and FIGURES Published by STEEL

Construction	Sept. 15	Gear Sales	Sept. 15	Radio, TV	Oct. 6
Durable Goods	Sept. 22	Gray Iron Castings	Sept. 22	Ranges, Elec.	Sept. 29
Employ., Metalwkg.	Sept. 8	Indus. Production	Sept. 15	Refrigerators	Sept. 29
Employ., Steel	Apr. 28	Ironers	Oct. 6	Steel Castings	Sept. 22
Fab. Struc. Steel	Sept. 1	Machine Tools	Oct. 6	Steel Forgings	Sept. 15
Foundry Equip.	Sept. 1	Malleable Castings	Sept. 22	Steel Shipments	July 23
Freight Cars	Sept. 29	Prices, Consumer	Sept. 8	Vacuum Cleaners	Oct. 6
Furnaces	Sept. 29	Prices, Wholesale	Sept. 8	Wages, Metalwkg.	Sept. 8

769 TV sets produced in August, 1952, compared to 146,705 units made in August, 1951, up 171 per cent. Radio output was 543,802 units in August, 1952, against 563,407 sets made in August, 1951, a 3 per cent slip.

Paced by high demand, Westinghouse Electric Corp. reports employment at its Television-Radio Division plant, Sunbury, Pa., is currently 28 per cent over the same period in 1951, and over-all production is running 35 per cent over the same eight-month period last year. Admiral Corp. estimates it will take at least nine months to catch up with present demand for its new $200 21-inch TV set.

Industrial Building Goes Up . . .

Contract awards for heavy construction totaled $234.3 million for the week ended Oct. 2, says *Engineering News-Record*. That's 25 per cent under the average week to date. Big factors in the week's award total were industrial building ($66.8 million, 29 per cent above the average week to date) and private mass housing ($54.5 million, down 7 per cent from the average week).

Expenditures for new construction put in place in September totaled $3112 million, about the same as in August, estimates the Bureau of Labor Statistics. That's the third consecutive month dollar outlays have exceeded the $3-billion mark, which adds up to the largest quarterly volume on record—$9.3 billion. Expenditures were $8.7 billion in third quarter, 1951.

There's still some $66 billion in construction award backlogs, enough for three years' activity at present rates of operation, says *Engineering News-Record*.

Employment Holds Steady . . .

The number of factory workers laid off this August—9 out of every 1000—was about one-third less than in August, 1951. Indicating a continuing favorable employment situation, less than 700,000 persons were claiming state unemployment insurance benefits in mid-September. That's a new post-World War II low.

Total employment remained al-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Output (per cent of capacity)[2]	103.5	102.5	101.0
Electric Power Distributed (million kwhr)	7,600[1]	7,625	7,146
Bituminous Coal Output (daily av.—1000 tons)	1,671[1]	1,922	1,856
Petroleum Production (daily av.—1000 bbl)	6,520[1]	6,507	6,304
Construction Volume (ENR—millions)	$234.3	$317.1	$421.9
Automobile, Truck Output (Ward's—units)	138,787	141,228	112,868
TRADE			
Freight Car Loadings (unit—1000 cars)	870[1]	862	859
Business Failures (Dun & Bradstreet, number)	129	156	133
Currency in Circulation (millions)[3]	$29,417	$29,247	$28,320
Dept. Store Sales (changes from year ago)[3]	−2%	+1%	−2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$17,277	$18,551	$17,501
Federal Gross Debt (billions)	$262.7	$263	$257.3
Bond Volume, NYSE (millions)	$16.1	$15.7	$15.9
Stocks Sales, NYSE (thousands of shares)	5,178	6,183	10,231
Loans and Investments (billions)[4]	$75.5	$76.0	$71.4
United States Gov't. Obligations Held (billions)[4]	$31.7	$31.9	$31.2
PRICES			
STEEL's Weighted Finished Steel Price Index[5]	181.40	181.40	171.92
STEEL's Nonferrous Metal Price Index[6]	221.0	221.0	234.9
All Commodities[7]	111.1	111.3	113.7
All Commodities Other Than Farm and Foods[7]	112.7	112.7	114.9

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1951, 1,999,035; 1952, 2,077,040. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

most unchanged from August to September of this year. Estimate for the week ended Sept. 13, 1952, was 62.3 million, compared to 62.4 million a year ago, says the Census Bureau. Unemployment continued to skid in September, reaching 1,438,000. That's less than the 1,604,000 in August or 1,942,000 in July. Secretary of Commerce Charles Sawyer comments, "This is probably the lowest (level of unemployment) in recent history, except at the height of World War II."

Power Spirals Higher . . .

The whirling dervish of electric utility production set a 388.5-billion-kwh record for the 12 months ended Aug. 31, 1952. Adding industrial production, total power output for that period was 450,573,305,000-kwh. Utility and industrial production was 39,752,136,000-kwh for August, 1952, a 5.6 per cent increase over August a year ago.

Business Failures Dip . . .

Commercial and industrial failures dipped to 129 in the week ended Oct. 2 from 156 in the preceding week, reports Dun & Bradstreet Inc. While casualties were about even with a year ago when 133 occurred, they were down from the 1950 total of 154.

Retail mortalities in the current week fell to 62 from 87 and wholesaling declined to 9 from 18. Manufacturing and construction showed a rise in failures, manufacturing up to 28 from 24 and construction up to 19 from 13.

Petroleum Stocks Increase . . .

Stocks of domestic and foreign crude petroleum in the week ended Sept. 27 totaled 265,901,000 barrels compared with 264,466,000 barrels for the preceding week.

Trends Fore and Aft . . .

New businesses chartered during August dropped to the smallest number since last December, 7108 . . . Man-days lost in August declined to the lowest figure since March, 1952, 2.1 million . . . Also in August, manufacturer's sales increased 2 per cent over July, inventories of durable goods increased $400 million and new orders added $500 million to durable goods back orders, all figures being seasonally adjusted . . . C. F. Cocke, president, American Bankers Association, says consensus is the defense production program will reach its peak some time in the spring.

for Quality Reamers

GI

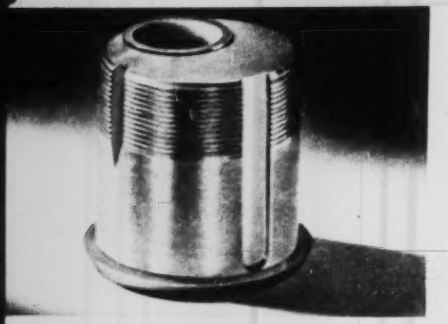
stands alone

GI

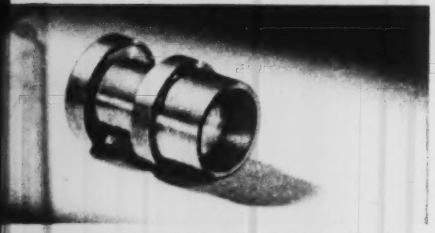
The Reamer Specialists

LAVALLEE & IDE, INC.

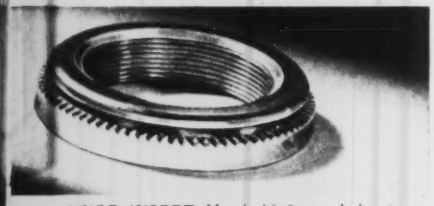
CHICOPEE, MASS.



LOCK CYLINDER. Metal: 1¾" dia. brass • Machine: model 60L New Britain Gridley • Operations: *cross slide*—rough form, finish form, break down cut off; side mill, vertical end mill, final cut off; *tool slide*—face, drill offset hole, ream and counterbore offset hole, thread • Spindle Speed: 1,324 rpm • Feed: .006" per revolution • Tools: high-speed steel • Cycle Time: 7.3 seconds



CARPENTER'S PLANE PART. Metal: ⅞" B1113 steel • Machine: Brown & Sharpe Automatic Screw Machine • Operations: *front cross slide*—form; *rear cross slide*—cut off; *turret*—feed stock, spot drill, drill 13/32" hole, tap drill, reverse spindle and tap left-hand thread • Spindle Speed: 1,130 rpm • Feed: .0025" per revolution • Tools: high-speed steel • Cycle Time: 30 seconds



KNOB INSERT. Metal: 17/32" round aluminum • Machine: model 6L 1¼" New Britain Gridley • Operations: *cross slide*—form, knurl, cut off; *tool slide*—spot drill, tap, ream, recess • Spindle Speed: 1,600 rpm • Feed: .005" per revolution • Tools: high-speed steel • Cycle Time: 7 seconds

SUN OIL COMPANY, Dept. S-7.
Philadelphia 3, Pa.

I am having trouble possibly caused by an inadequate cutting oil. I would like ☐ the services of a Sun representative; ☐ the booklet "Cutting and Grinding Facts."

Name _____

Title _____

Company _____

Street _____

City _____ Zone _____ State _____

MORE THAN 300 PARTS ARE MACHINED with the aid of *one* cutting oil for tools and hardware items made by Sargent & Co. Raw materials worked are: B1113 steel, 11ST-3 aluminum, ASTM-B140-46 Type B half-hard bronze, B16-46 brass, and Type 416 stainless steel. Stock ranges from 1/16" wire to 2" bars.

SINGLE GRADE OF SUNICUT REPLACES 4 CUTTING OILS

A good example of cutting-oil economy and efficiency is provided by Sargent & Co., well-known hardware and tool manufacturers. Their complete line requires the machining of more than 300 parts from a wide range of metals. A few years ago this company was using four different cutting oils, purchased in drums. By switching to a single product, Sunicut 11W, and buying it in bulk, Sargent has been able to effect an annual saving of about $3,000. All operations are performed as well as before, or better—and shop efficiency is up.

Sunicut 11W is a low-viscosity, dual-purpose cutting oil for automatics machining all nonferrous metals and free-machining steels such as B1112 or B1113. Its transparency permits quick and accurate miking. It will not stain brass or copper under normal conditions. It drains rapidly, minimizing carry-off. And its high lubricating and cooling properties aid in prolonging tool life and improving finishes. Moreover, it protects finished parts from rust and corrosion.

Other Sun cutting oils offer similar opportunities for improved operations and economy. For information about them, or the help of a Sun representative, use the coupon at the right.

SUN INDUSTRIAL PRODUCTS
SUN OIL COMPANY, PHILADELPHIA 3, PA. • SUN OIL COMPANY, LTD., TORONTO & MONTREAL

SUNOCO

Men of Industry

FRANCIS O. CASE
. . . president of Anaconda Aluminum

C. B. McGEHEE
. . . V. P. of Truscon

ANDREW GAGARIN
. . . slated for presidency of Torrington

Francis O. Case, vice president of Anaconda Copper Mining Co., New York, since 1948, was elected president of the newly formed **Anaconda Aluminum Co.,** formerly the Harvey Machine Co. Inc. of Montana, now a subsidiary company. During World War II, Mr. Case was general manager of Basic Magnesium Inc. Anaconda's primary aluminum plant, now in the preliminary construction stage, is to be located near Columbia Falls, Mont., and is scheduled for completion early in 1954.

Hydraulic Press Mfg. Co., Mt. Gilead, O., appointed **Richard K. Schrecongost** as manager of its die casting machinery division. Before joining H-P-M in September he was plant manager of Pressco Casting & Mfg. Co.

Alvin H. Sommer was elected vice president and general manager, **Keystone Steel & Wire Co.,** Peoria, Ill. Elected as members of the executive committee were **W. B. Sommer,** vice president; **Paul W. Sommer,** vice president-treasurer; and **Walter V. McAdoo,** vice president.

C. J. Masepohl was promoted to works manager, **Calumet Steel Castings Corp.,** Hammond, Ind. **W. J. Jicha,** formerly foundry superintendent, was advanced to general superintendent.

C. B. McGehee was made vice president, **Truscon Steel Co.,** Youngstown, subsidiary of Republic Steel Corp. He joined Truscon 25 years ago as an engineer. Since 1942 he has been general manager of sales.

Earle G. Hines has retired as chairman of **General Precision Equipment Corp.,** New York. He is succeeded by **Herman G. Place** who retains the posts of president and chief executive officer. Mr. Hines will serve in a consultative capacity.

A. B. Dick Co., Niles, Ill., promoted **Gordon C. Petersen** to director of manufacturing. He replaces **Andrew L. Pontius,** resigned to take a similar position with Shakeproof Division, Illinois Tool Works. Mr. Petersen is succeeded by **Garland Craig** as superintendent of supplies manufacturing.

David B. Tyler was made advertising manager, **Norton Behr-Manning Overseas Inc.,** Worcester, Mass.

Arthur J. Westphal was elected vice president-sales and secretary, and **Alfred A. Diebold** vice president-operations of **Atlas Steel Casting Co.,** Buffalo. **Eugene L. Altenburg** was elected executive vice president and treasurer.

Andrew Gagarin will succeed **S. W. Farnsworth** as president of **Torrington Mfg. Co.,** Torrington, Conn., Jan. 1, 1953, when Mr. Farnsworth becomes chairman of the board. Mr. Gagarin is currently vice president. He joined the company in 1946.

Albert J. W. Novak was appointed assistant general sales manager, **Brush Development Co.,** Cleveland. He has been manager, instrument department, sales division.

Warren Carhart was elected vice president, **South Western Gear Works,** Houston, an affiliate of Western Gear Works. **Paul Mamont** is head of a new Western Gear sales and engineering office in Dallas.

M. L. Snodgrass joined **Sargeant & Wilbur Inc.,** Pawtucket, R. I., as sales manager of the heavy furnace division. He formerly was vice president, Gas Machinery Co. **T. E. Schroeder** also joins the company as chief engineer of the division.

F. L. Blodgett was promoted from manager, hard-facing division, to assistant general sales manager of **Alloy Rods Co.,** York, Pa.

Ernest E. Bang was appointed ad-

vertising manager, **Berger Mfg. Division, Republic Steel Corp.**, Canton, O.

William J. Fleming, formerly manager of manufacturing and engineering of **General Electric Co.'s** X-Ray Department, Milwaukee, was made general manager of GE's Lighting & Rectifier Department at Lynn, Mass. He is replaced at Milwaukee by **E. R. Koester** as manager, manufacturing, and **Dr. Martin A. Edwards** as manager, engineering. Mr. Koester was manager of manufacturing, Small Appliance Division, Bridgeport, Conn., and Dr. Edwards was engineering manager of the General Engineering Laboratory at Schenectady, N. Y.

Michael F. Wiedl Jr. joined the advertising department of **Atlantic Steel Co.**, Atlanta.

Sherwood B. Seeley was promoted to technical director of **Joseph Dixon Crucible Co.**, Jersey City, N. J.

Wagner Electric Corp. appointed **Arthur H. Beasley** manager of its Memphis, Tenn., sales branch to succeed **A. Callaway Allen**, now sales manager, electrical division.

Robert I. Ingalls Jr. was elected chairman of **Ingalls Iron Works Co.**, Birmingham. He succeeds his mother, **Mrs. Ellen Ingalls**, who became chairman after the death of her husband, **Robert I. Ingalls Sr.** Mrs. Ingalls was elected vice chairman.

DR. JASON SAUNDERSON
named director-engineering at Baird Associates Inc., Cambridge, Mass. Noted in STEEL, Sept. 22, p. 103

At **R. M. Hollinshead Corp.**, Camden, N. J., **A. E. Moore** was made vice president and director of research and development. He is replaced as director of new products development by **Dr. V. Esposito**, formerly assistant director. **V. M. Mantz** becomes director of government and industrial research.

Walter L. Smith was elected vice president in charge of operations and director of **Chase Brass & Copper Co. Inc.**, Waterbury, Conn., subsidiary, Kennecott Copper Corp. Formerly works manager for Chase Metal Works, Waterbury, he is replaced by **George Sengstacken**, previously general superintendent, whose place is taken by **F. G. Parker**.

Robert W. Holman was appointed assistant general superintendent, Gary, Ind., Sheet & Tin Mill, **U. S. Steel Co.** He succeeds **John E. Angle**, now general superintendent of the plant. **Charles M. Shank** succeeds Mr. Holman as division superintendent, maintenance and utilities.

L. F. Reimann was made assistant vice president of manufacturing, **Jackson & Church Co.**, Saginaw, Mich. Associated with the firm 27 years, he has been superintendent of its two plants in the Saginaw area since 1951.

Walter C. Bellin, formerly with Wagner Iron Works, joined **Atlas Iron & Wire Works**, Milwaukee, as vice president in charge of sales.

J. Y. McCandless is in charge of the newly established district sales office in Syracuse, N. Y., for Tubular Products Division, **Babcock & Wilcox Co.**

A. Milne & Co. appointed **James K. Hoyt** assistant western manager with headquarters in San Francisco.

David A. Thomas was appointed executive vice president and general manager, **Automatic Steel Products Inc.**, Canton, O. He was with American Insulator Corp., where he held the same positions. He previously was associated with

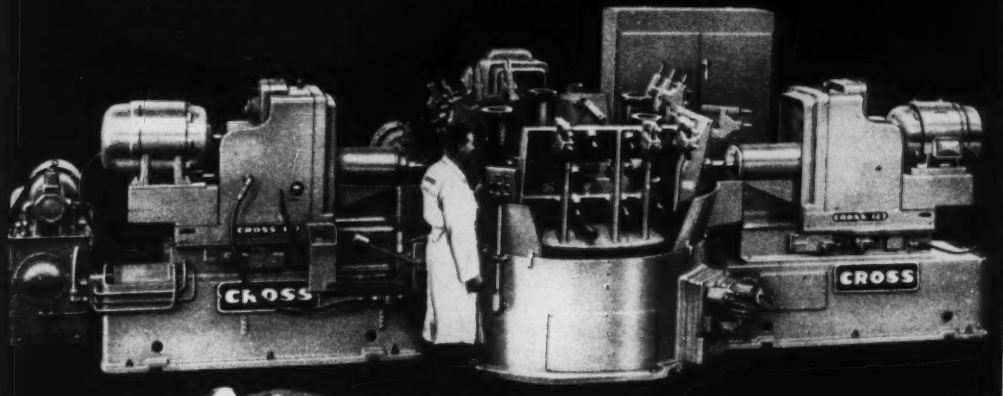
ROBERT I. INGALLS JR
board chairman of Ingalls Iron Wks.

WALTER L. SMITH
. . . Chase Brass V. P.-operations

DAVID A. THOMAS
. . . an executive of Automatic Steel

Drills and Reams Tank Suspension Support Housings

Another Special by Cross



- ★ Drills and reams two holes of 3.995/4.000 diameter in 11 pieces per hour at 100% efficiency.
- ★ Material: Cast Armor, Rockwell C-42.
- ★ Fluid motor driven index table with four stations—one for loading, one for drilling, one for flat bottom drilling, one for reaming.
- ★ JIC standard hydraulic and electrical construction with stranded wire.
- ★ Other features: hardened and ground ways, hydraulic feed and rapid traverse, pre-set tools, automatic gravity operated cam clamping for the index table.

Established 1898

THE CO.

DETROIT 7, MICHIGAN

Special MACHINE TOOLS

WILLIAM O. SPRINGER
. . . Ryerson New York plant mgr.

JOHN J. WATSON
. . . Bartlett & Snow foundry sales

R. L. BERNHARD
. . . to manage American Blower dept.

Foote Bros. Gear & Machine Corp.

William O. Springer was appointed manager of the New York plant of **Joseph T. Ryerson & Son Inc.** He formerly managed the Cleveland plant where he is replaced by **John W. Queen. James M. Mead,** whom Mr. Springer replaces at New York, is moving to executive offices at Chicago for administrative duties.

Myron C. Meyer was promoted to manager, wire braid hose sales, **Republic Rubber Division,** Lee Rubber & Tire Corp., Youngstown. He has been assistant to the sales manager.

Air Reduction Sales Co. appointed **A. S. Blodget Jr.** manager of its Pittsburgh district. He is succeeded as manager, Boston district, by **E. S. Twining Jr.,** formerly assistant sales manager, Philadelphia district. The changes follow the death of **S. D. Edsall,** former manager at Pittsburgh.

John J. Watson, formerly Detroit office manager, **C. O. Bartlett & Snow Co.,** was appointed manager of foundry sales with headquarters at the home office in Cleveland. **L. F. Harding,** formerly of Harding Engineering Co., joins the Detroit sales office.

Felix W. Saco joined **Permutit Co.,** New York, as mechanical development engineer assigned to work on design of all applications of ion exchange materials and techniques in the treatment of water and other liquids.

Oscar A. Bamberger and **Lowell M. Immel** were appointed to positions at **Republic Steel Corp.'s** central alloy district. Mr. Bamberger becomes an assistant district manager with headquarters in Massillon, O., and Mr. Immel succeeds Mr. Bamberger as superintendent of the Canton, O., steel plant.

R. L. Bernhard joins **American Blower Corp.,** Detroit, as manager of the newly created centrifugal compressor department. He has had more than 18 years' experience in the centrifugal compressor field.

At **MacWhyte Co.,** Kenosha, Wis., **E. C. Berg** was appointed vice president and controller, **G. Johnston** treasurer and assistant secretary and **M. A. Buntrock** secretary and assistant treasurer. They were also elected directors.

Producto Machine Co. appointed **David S. Hodgson** as district sales manager in charge of the New York area. He will oversee the new sales office and warehouse recently opened in Rochester.

L. E. Brungraber was transferred from the engineering department to the New York sales staff of **Bigelow-Liptak Corp.,** Detroit.

OBITUARIES . . .

John A. Moritz, 62, superintendent of wire mills at **Keystone Steel & Wire Co.,** Peoria, Ill., died Sept. 27. Associated with Keystone for 40 years, he also was vice president-operations of the subsidiary, Mid-States Steel & Wire Co., Crawfordsville, Ind.

Neils Y. Anderson, 64, a development engineer associated with **Bethlehem Steel Co.** and the old Donner Steel Co. in Buffalo for many years, died Oct. 2.

John H. Wellman, 40, secretary and purchasing agent of **Wellman Bronze & Aluminum Co.,** Cleveland, died Oct. 6 after a few days' illness.

William H. Dunn, 69, retired treasurer and director, **Raybestos-Manhattan Inc.,** Passaic, N. J., died Sept. 29.

J. Kent Burton, 50, manager of manufacturing at the Horseheads, N. Y., plant, **Westinghouse Electric Corp.,** died Sept. 26.

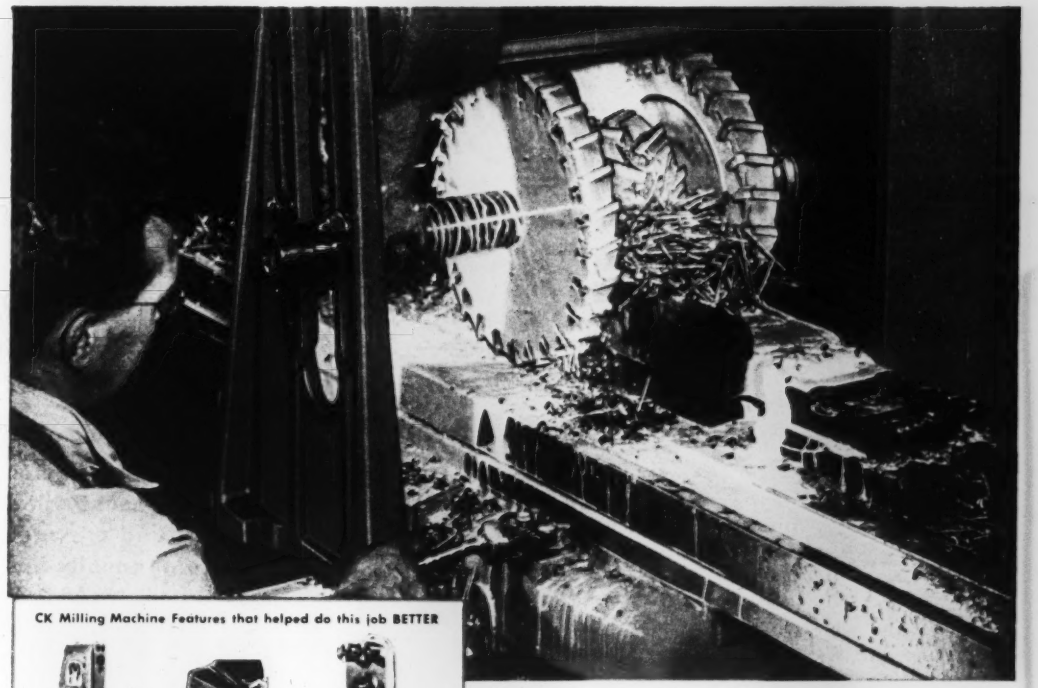
Edward W. Ferry, 56, president of **E. W. Ferry Screw Products Co. Inc.,** Cleveland, died Oct. 2.

L. W. Faber, 57, purchasing agent for **Grumman Aircraft Corp.,** Bethpage, N. Y., died Oct. 1.

Thomas W. Page, 44, mining engineer with **Armco Steel Corp.,** Middletown, O., died Sept. 6.

FACTS TELL THE STORY...

NEW CK MILLING MACHINE PAYS USER BIG PRODUCTION DIVIDEND

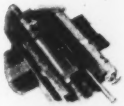


CK Milling Machine Features that helped do this job BETTER

New CK column easily absorbed vibration from heavy cutting load.

CK's large (2" dia.) screw and extra-long table feed nut permitted heavy cut.

No. 60 heavy-duty drive flange on spindle drives heavy-duty arbor with multiple cutters.



CK's positive, metered, pressure and automatic lubrication assured wear-free operation.

Greater Horsepower of CK machine meant maximum results from modern cutting tools.

CK's 3-bearing spindle and flywheel assured fastest metal removal with desired finish.

24 different spindle speeds (13 to 1300 rpm) plus 32 different table feeds (½" to 90 ipm) meant operator selected exact combination to get fullest advantage from high horsepower and modern cutting tools.

The FACTS on this job are:

Machine: New 25hp No. 5, Model CK Plain.
Material: Cast Steel, 150 Brinell.
Feed: 4½ inches per minute.
Cutter Speed: 100 Surface feet per minute.
Rate of metal removal: 17.5 cu. in. per min.
Production rate: 4 parts per hour.
NOTE: Each part requires but a *single pass* of the cutter on the new Kearney & Trecker CK machine.

Old production rate 1½ parts per hour with two passes required per piece.

Investigate Kearney & Trecker's new CK line of milling machines. You'll find every feature is test and job-proven to give you cost-cutting results . . . greater machine capacity . . . greater productivity . . . better finished products. Contact your nearest Kearney & Trecker representative or write: Kearney & Trecker Corp., 6784 West National Avenue, Milwaukee 14, Wisconsin.

KEARNEY & TRECKER
MILWAUKEE
MACHINE TOOLS

Established 1888

D.O.James

CENTRALLY DRIVEN BALANCED DRIVE
With Great Emergency Strength

GEAR SPEED REDUCERS

Multiple tooth engagement, low tooth stresses, with high load capacity and high wear factor. Gears are heat treated, shaved and crowned (Elliptoid), equally balanced and revolving in same direction, quiet operation, long gear life, and highest efficiency.

Catalogs are available containing complete engineering data.

D.O.JAMES GEAR MANUFACTURING CO.
1140 WEST MONROE STREET • CHICAGO 7, ILLINOIS

Production AND Engineering NEWS AT A GLANCE

GOOD CORROSION BLOCKER—If protecting steel bolts is one of your main problems when using the fasteners with aluminum structures, you can save a few headaches by plating the bolts with a tin-zinc alloy. Tests made by Fulmer Research Institute in England indicate that the tin-zinc coating gives the best protection at the same time keeping aluminum corrosion to a minimum. Straight zinc coatings do the next best job, but attack the aluminum slightly.

HEAT: NO. 1 PROBLEM—The jetomic age looms as the era of the battle of heat so far as engineering materials are concerned. Two standout reasons: Jet engines and nuclear reactors. Because the problem with jet engnes is heat, strategically important metals hold the key to their performance. Large numbers of engines mean efficient utilization of the materials. Like the jet engines, heat is the top problem of nuclear reactors. Fuel involved is capable of supplying heat at as high a temperature as construction materials can stand, and at almost any rate that may be desired. Materials that satisfy specifications of nuclear reactors are not ordinary engineering materials. Big problem is producing such materials in a satisfactory state of purity, and of developing methods for fabricating them into shapes needed in the reactor. p. 149

LIGHT SOURCE FOR RESEARCHERS—Two Bostonian scientists at Tracerlab Inc. have developed a process that provides a new light source for calibrating instruments containing phototubes. Tritium—a product of the Oak Ridge Atomic reactor—is used in the method which makes a substantially constant light source. The radioactive tritium is incorporated into stilbene, a crystalline substance, and processed chemically to form a solid crystal. The tritium constantly gives off beta rays which cause the stilbene to fluoresce. Brightness of the nonhazardous light diminishes about 5 per cent each year. It's estimated that 50 per cent of the light output is retained even after 10 years of use.

TWOFOLD SAVINGS SPEED TREND—Trend toward the use of drag-out stations after barrel plating appears to be definite. The reason is the twofold savings derived, according to Frederic B. Stevens Inc. Savings come from the amount of solution that is conserved, and the less severe problem of disposing plating room wastes since the drag out is periodically fed back to the plating tank.

SIMPLIFIED CORE BOX SYSTEM—If cylindrical core boxes are a problem in your foundry, a method developed by National Bureau of Standards may go a long way in solving it. System devised by the bureau involves a set of 14 boxes for cores ranging in diameter from ⅜-inch to 2 inches in ⅛-inch steps. Thus there's a box for each diameter core, and the length of each is fixed at the maximum likely to be required for a core of that diameter as indicated by experience. Shorter cores can be cut from full-length units or can be made by placing cylindrical pieces of wood of the proper length in the core box cavity. When a core with a tapered end is required, a brass insert with a standardized taper is placed in the core box. NBS cores are filled and rammed with conventional mixtures. Boxes are of wood, but metal can be used just as easily.

RESEARCH IS BUSINESS INSURANCE—Research is a sort of business life insurance. Benefits derived more than justify large expenditures of time and money. They spread in many directions, improve metal quality throughout all industry. Certainly, the automotive industry can be credited with many of the important advances in metallurgy, either through its own research developments or through pressure exerted by the industry on its suppliers. At General Motors, about one-third of the research department's effort is in the direction of metallurgical consultation with various GM divisions on current production problems and in planning new products. One of its chief objectives is finding some means of testing materials to simulate real field conditions. p. 166

WANTED: A LEAK STOPPER—If you've ever worried over a slow leak in an automobile tire, you'll have an inkling as to how scientists at GE's research lab feel about leaks so infinitesimal it would take 10,000 years to empty the contents of a pint bottle. Hydrogen and other gases, they say, seek their way through glass or metal at these rates; and these tiny leaks are enough to spoil vacuums used in research. Helium, they say, filters easily through glass and plastics, but fails to penetrate metals in any measurable quantities. Hydrogen quickly invades iron, palladium and other metals, as well as glass and plastics. Nitrogen penetrates steel, but is effectively contained by copper Oxygen slips through silver with comparative ease.

METAL SHOW TAKES OVER—When the American Society for Metals gets its 34th annual National Metal Congress and Exposition rolling next week, four of Philadelphia's hotels and Convention Hall will be humming with activity. More than 400 exhibits will occupy Convention Hall. At the hotels, metallurgists and production men will pay close attention to working with new metals and some of the old stand-bys under the mechanical stresses and temperature extremes required in the Jetomic Age. ASM's seminar on modern research techniques in physical metallurgy will lead off the sessions two days before the official opening of the show. p. 179

Metalworking Outlook—p. 111 *Market Outlook—p. 345*

Metals in the Jetomic Age

By DR. ALLEN G. GRAY
Technical Editor

Commercial zirconium products produced by the iodide method. Atomic energy applications need the hafnium removed

High temperatures plus corrosive atmospheres, radiation and stress make the metallurgist's job difficult. Short supply of critical elements is another big hurdle

SCIENTIFIC advances are creating new demands for materials to withstand extreme conditions of temperature, corrosive atmospheres, radiation and stress. Future developments in scarce materials or new metals to produce needed superalloys will stem from efforts of practical men seeking a desired result working with those who have a scientific understanding of metals.

Heat's the Problem—Piston engines mean friction but jet engines mean heat. It is still true that strategically important metals hold the key to jet engine performance. If large numbers of jet engines are to be built these materials must be utilized efficiently.

Several lines of approach are being followed: Development of more efficient manufacturing procedures, assisted in some cases by design modifications, so that parts can be made from smaller quantities of critical materials. Substitution of protectively coated carbon or low-alloy steels for stainless alloys in parts operating at relatively low temperatures. Development of less critical superalloys, having high temperature properties equal or superior to those of existing materials is fundamental.

Another Hot Job—An objective in the design of nuclear reactors is operation at a sufficiently high temperature to permit the generation of useful power. The fission process is an intense sort of thing and the energies of the fission fragments are tremendous. Nuclear fuel is capable of supplying heat at as high a temperature as construction materials can stand and at almost any rate that may be desired.[1]

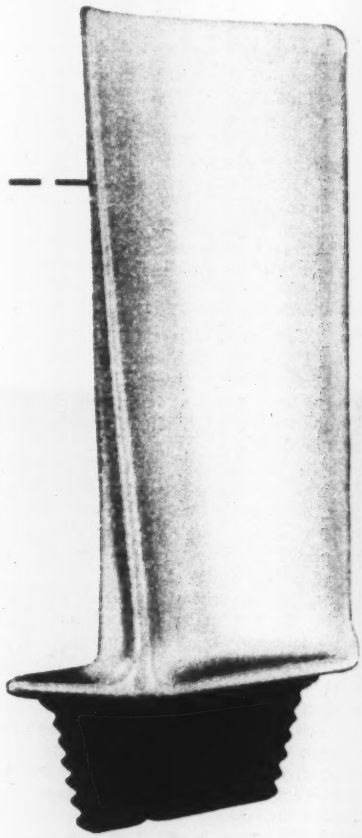
Many of the materials which satisfy the specifications for nuclear reactors are not ordinary materials of engineering design. There is the problem of producing such materials in a satisfactory state of purity and of developing methods for fabricating them into the shapes needed in the reactor.

In considering superalloys or materials for ultra high temperature service, it is important to distinguish between four different types: Metals and their alloys, metals protected with ceramic coatings, ceramic materials and combinations of metals and ceramics.

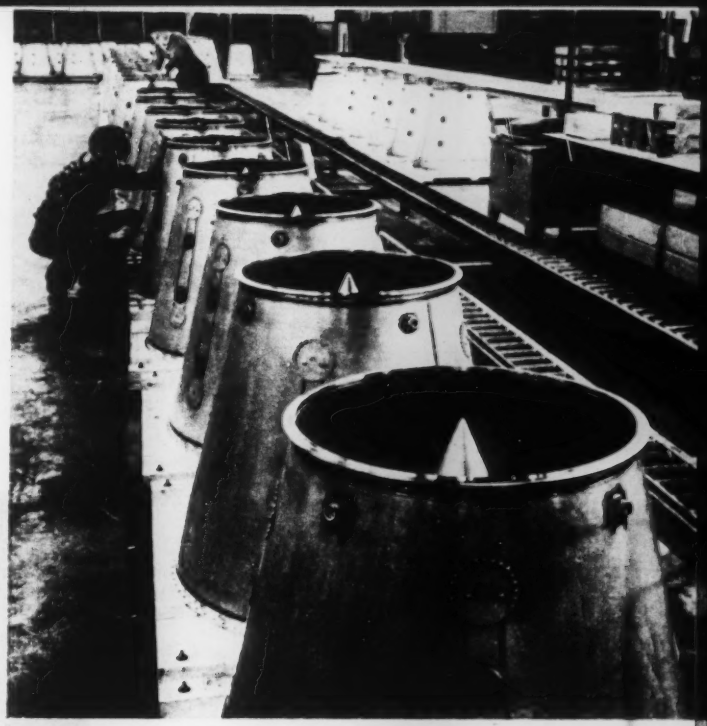
High Temperature Alloys

Military rearmament has focused attention on two major problems with respect to materials for high temperature service. The first is the limited availability of cobalt, columbium, nickel and the other alloying elements constituting the basis of our commercial heat resistant alloys. The second is the temperature limitations of present-day high temperature alloys.

Alloys are supplied which give reasonably satisfactory performance in land based equipment. However, they are still short of the mark particularly for what is desired in the field of aircraft gas turbines. Fuels are available to provide the necessary operating temperatures for more powerful and efficient gas turbines but our present blading materials do not retain the desired engineering properties at temperatures exceeding about 1600° F.



Ceramic coated molybdenum jet engine bucket developed by Thompson Products guards against high temperature oxidation. Solution of the oxidation problem will make molybdenum a big factor in high heat applications



Tailcones for General Electric's J-47 jet engine are lined up in the receiving and inspection area. Defense jobs like this put the metallurgist on his mettle not only to produce material but to conserve scarce alloys

Close Scrutiny—Need for conservation of our critical alloying elements led to the development of leaner alloy compositions for gas turbines now in production. It is an encouraging note that some jet engine builders are examining their operations to see if there may not be less-rich alloys or even ferritic steels that may be used for some parts that see service in between the older fields of engineering materials and the 1200° F field of the newer alloys.

If stresses are high and if temperatures encountered are much in excess of 1000° F, the austenitic chromium-nickel type alloys are generally used. For lower temperatures, choice between ferritic stainless steels and low alloy steels is often based on creep values and requirements of corrosion resistance. In some applications consideration must be given to selecting the alloy least subject to stress-corrosion cracking.

Burner liners, transition ducts and parts of exhaust tail cones in a turbine engine are exposed to temperatures ranging from 1200 to 1800° F. Thermal stresses resulting from high thermal gradients tend to produce buckling and eventual cracking. Materials in sheet form widely used for these parts are nickel-base alloys. Tests are being conducted on a new iron base alloy containing 20 per cent chromium, 35 per cent nickel and 1 per cent titanium for use in hot-operating sheet metal parts. If tests are successful considerable savings in nickel will result.[2]

Best Falls Short—To retain the required dimensional stability for turbine nozzle guide vanes only alloys which have high creep strength and oxidation resistance at temperatures of 1600° F or higher can be considered. Because of their shapes, hollow nozzle guide vanes are difficult to fabricate from high strength heat-resistant alloys. Precision investment castings consisting of cobalt-base alloys are used. Even the best of cobalt-base alloys are not all that is desired for this high temperature application. Nevertheless, development work is going on to produce a reduced cobalt-content alloy. Promising results have been obtained with a high nickel-chromium alloy containing tungsten and molybdenum with only about one-fourth the amount of cobalt normally used.[2]

A ductile cobalt-base alloy is available to fill the need for a high temperature gas turbine sheet mate-

rial. It has an approximate composition of 13-21 per cent chromium, 9-11 per cent nickel, 46-53 per cent cobalt, 3 per cent iron and 14-16 per cent tungsten with about 1 per cent manganese and silicon. At 1700° F the stress necessary to rupture the metal in 100 hours is 11,000 psi; at 1800° F for 100 hours the stress-rupture strength is 7000 psi. The alloy has good resistance to oxidation and carburization up to 1900° F. It can be formed by deep drawing, spinning, stamping and drop hammer operations. Welding has been done with roller seam, spot, heliarc and electric arc methods.

Strategic Scrap—Another recent development by Haynes Stellite is high temperature alloy No. 99, utilizing scrap whose chemical analysis would make it otherwise unreclaimable. The alloy, sometimes called "hash" alloy, might be regarded as a modified N-155 containing less cobalt and no columbium, with a small amount of added boron. Approximate composition of the alloy is 20-22.5 per cent chromium, 2-3 tungsten, 11-13 cobalt, 17-19 nickel, 3-4 molybdenum, 0.03-0.08 boron, about 1 per cent each of silicon and manganese and the remainder iron. This alloy serves as an alternate for strategic alloys.

Tests are in progress on Hastelloy alloy X with a nominal composition of 22 per cent chromium, 45 nickel, 9 molybdenum with the balance iron. It is designed to replace strategic cobalt and columbium bearing alloys and high nickel, low iron materials in some applications. Of particular interest is the alloy's high iron content and ability to be made with the lesser strategic ferrochromium in place of pure chromium metal. Alloy scrap containing relatively large amounts of iron may also be used in its manufacture.

Alloy X looks good for potential use in sheet metal components for jet engines, cabin heaters, tail cones and collector ring parts. It is also being studied for use in aircraft nozzle vanes.

Getting More Study—Various alloy fields are being explored in the 1200-1500° F level. Some metallurgists feel that improvements in this temperature range are apt to be made by studying the structure, the influence of heat treatment and of hot and cold working than by further alloy variations and additions. Since it is possible to vary the time for rupture many-fold under 40,000 psi for the same N-155 bar stock with different treatments, the importance of getting to know our present alloys better is obvious[3].

Inconel X with the approximate composition 15 per cent chromium, 78 nickel, 5-6 iron, 0.75 columbium, 2.5 titanium and 1 per cent aluminum is one of the oldest of the high temperature super alloys. Recent developments have been aimed at improving its high temperature properties through slight modifications in chemistry and processing.

A popular high temperature British jet alloy, Nimonic 80A, was developed simultaneously with Inconel. It has the composition: 80 per cent nickel, 20 chromium, 2.5 titanium, and 1 per cent aluminum. Age hardening alloys of these types are used in applications such as turbine buckets.

The possibility that a critical material shortage could develop in the production of turbine blades lends impetus to numerous research programs aimed at less critical turbine blading materials. Considerable effort is being directed at a nickel-base precipitation hardening alloy similar to the series of alloys widely used in British jet engines. Despite the possibilities for improving present alloys, the feeling is that they may fail to meet the requirements of the coming gas turbine era which will probably require a service temperature of at least 1700°F without any reduction of the stress level. Metallurgists are thinking in terms of combinations of new metals of higher melting point.

Molybdenum

At temperatures above 1600° F the creep and stress rupture properties of molybdenum are superior to conventional high temperature alloys. Chief deterrent to use is lack of a proven method for protecting the surface against rapid oxidation at high temperature. Stainless alloys melt in the range 2500-2600° F. Molybdenum melts at 4750° F. It has structural stability at temperatures where most high temperature alloys are a pool of metal. It also has about seven times the thermal conductivity and about one-third the thermal expansion of austenitic stainless steels. These properties are important in reducing stresses due to thermal gradients.

Static tensile properties of unalloyed molybdenum are encouraging—for example, a yield strength of 40,000 psi in short time tests at 1800° F.[4] When the surface oxidation problem is solved, molybdenum

Conservation of nickel is the aim in applying ceramic coatings to combustion chambers and transition liners at Ryan Aeronautical. Base metal is 321 stainless steel

or its alloys may take its place as our strongest high temperature metal.

Welding Holds Key—Fabrication will depend largely on the development of welding techniques applicable to complicated structures. One recommended method for resistance welding is to roll a series of serrations or dimples in one of the sheets to be joined, thus providing a number of projections at which welding will be localized.[5] The resultant weld structure is somewhat brittle.

Molybdenum and molybdenum-rich alloys must be given some form of surface protection where oxidizing conditions exist at 800° F or higher for periods longer than several minutes, depending on temperature and permissible loss in thickness of molybdenum. Hot dipped aluminum coatings have been tried with some success.

Promising Coating—Best protection is shown by coatings of molybdenum disilicide. Life tests of over 5000 hours at 1800° F, and over 300 hours at 3000° F have been obtained with coatings 2 mils thick.[6] The coatings have also shown good service under load and when subject to thermal cycling.

Commercial applications of siliconized molybdenum will probably be made in the temperature range between 2000 and 3000° F beyond the range of nickel-chromium and similar alloys. The upper limit is imposed by the melting point of the molybdenum silicides, reported to be around 3300° F. Ceramic coatings also show promise for protecting molybdenum against oxidation.

Titanium

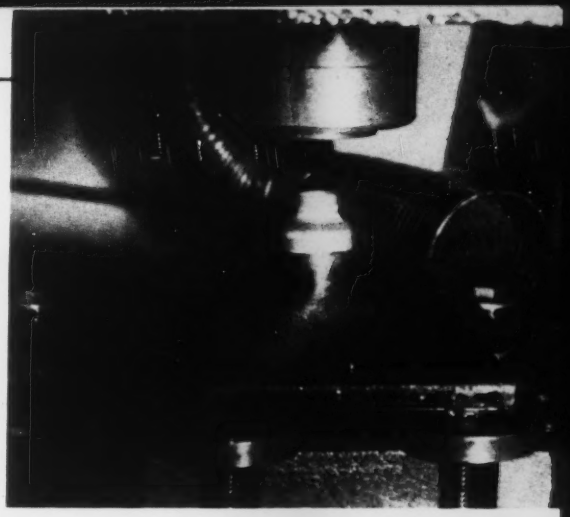
Titanium alloys now under development should find use in applications requiring a combination of high strength and light weight such as aircraft and in some uses, such as engine parts, involving service up to about 1000° F. Although it is reactive metal, titanium forms a protective oxide coating on its surface giving good corrosion resistance in atmospheric and salt-water service.

Added Muscle—Within the past year a number of titanium-base alloys have come on the market having strengths more than double that of pure titanium. These high strength alloys possess a basically similar metallurgical structure.[7] Unalloyed titanium is allotrophic, being hexagonal close-packed alpha below about 1615° F, and body-centered cubic metal above that temperature.

High strength titanium-base alloys are mixtures of alpha and beta. Association of beta with alpha appears to have at least three important advantages. First, the material is strengthened over the entire normal service temperature operating range, up to about 800° F. Second, the forces required to hot work the material are substantially decreased. And third, despite an increase in strength at service temperatures, the bend ductility may even increase with the introduction of beta into the microstructure.

Zirconium

Used for some time as a getter in electronic applications, zirconium is finding new uses as an alloying element. Now that the metal is available in ductile



Molybdenum cone deep drawn from 0.062-inch sheet heated to about 1000°F. Excess heating would cause material to stick to dies. Tube exhausts smoke from oil on dies

form it is being looked at more closely for possible application as a construction material. Outstanding property is its excellent corrosion resistance. Not only is the metal free from attack by the atmosphere or sea water at ambient temperatures, but also is practically as resistant as tantalum to acids and superior in resistance to alkalies.[8]

Zirconium is of considerable importance to atomic energy power reactors, since it has a good combination of chemical, physical and mechanical properties. It is also fairly transparent to thermal neutrons as shown by its place in the following list which gives the neutron absorption coefficient in barns for some heat resistant elements: Zirconium 0.4, iron 2.4, chromium 2.9, nickel 4.5, titanium 5.8, and tungsten 18.0. A disadvantage is that hafnium metal, which is just below zirconium in the periodic table, with a large absorption coefficient of 100 barns, is always present in zirconium minerals. The two elements are so similar in their chemical nature that even specially refined commercial zirconium contains too much objectional hafnium. Special methods are being used to purify zirconium on a tonnage basis.[9]

Care Required—Titanium and zirconium fabricators should understand the great importance of small amounts of impurities which are easily picked up by these reactive metals during their primary production. Hexagonal crystal structure of both titanium and zirconium is another point that should be kept in mind in choosing mechanical fabrication methods. This accounts for the fact that the workability of these metals is increased at temperatures about 400° F. Galling and seizing may be troublesome in drawing and machining. Seizing may be particularly severe in the cold drawing of tubing and wire. Metallic and solid resinous lubricants supply adequate lubrication for such operations.

Vanadium

Ductile vanadium metal developed recently has properties varying from 51,000 psi tensile strength and 7 per cent elongation for annealed metal to 155,-

000 psi tensile strength and 1 to 2.5 per cent elongation for 80 per cent cold-rolled metal. With an elastic modulus of 21 million psi, a density of 6.1, and a melting point of 3150° F, vanadium or its alloys may find use in applications requiring light weight and high strength at elevated temperatures. As with molybdenum, one big problem to be overcome is oxidation at high temperatures.[10]

For structural parts where flectural rigidity is the determining factor, high purity vanadium may be the first choice.

In ingot form, vanadium can be hot rolled at temperatures between 1475 and 2100° F by following practices used for austenitic stainless steels. The metal does not work harden to any great extent during cold working. It can be reduced up to 85 per cent without the need of annealing. Machinability of vanadium metal is comparable to cold-rolled steel and good surface finish is attained through the use of high cutting speeds.

Ductile Chromium

Work by the U. S. Bureau of Mines yields a process for production of ductile chromium sheet. Although the chromium sheet is brittle in the cold state, when heated above 900° F it can be bent and cut as well as mild steel. This type of chromium is difficult to dissolve in hydrochloric acid because of its purity. It tarnishes lightly in air when heated above 1800° F.

Ductile chromium can be machined easily and cut on the lathe if it is not subjected to bending. Its hardness is in the order of Rockwell B 60. Considering the great softness of the metal above 900° F and its low Rockwell B hardness at room temperature, it does not appear useful as a material of construction for highly stressed machine parts. However, high purity chromium-base alloys may be important in the future.[11]

Improved Magnesium

Addition of rare earth metals to magnesium produces cast alloys having elevated temperature properties superior to those obtainable with the older melts. By suitable treatment, creep strengths of 8000 psi at 400° F can be developed in the new alloys compared with 1500 psi for the magnesium-aluminum-zinc type. Most cast alloys of the new type in commercial production contain about 3 per cent rare earths as Misch metal together with 0.25 to 0.7 per cent zirconium. The addition of zirconium is essential to refine the grain in the casting and prevent cracking during freezing.

Magnesium-aluminum-zinc type casting can be used efficiently at elevated temperatures, depending on the magnitude of the stresses imposed. However, somewhere between 200 and 400° F a lighter design usually is possible if a magnesium-rare earth metal can be used. This is true when the operative stresses are high enough so that wall thicknesses greater than the minimum that can be cast are necessary.

Since temperature requirements for airplane service are continually becoming more severe, the primary need is an improvement in creep strength for service above 400° F. Thorium-magnesium alloys show exceptional strength up to 600° F.

Aluminum

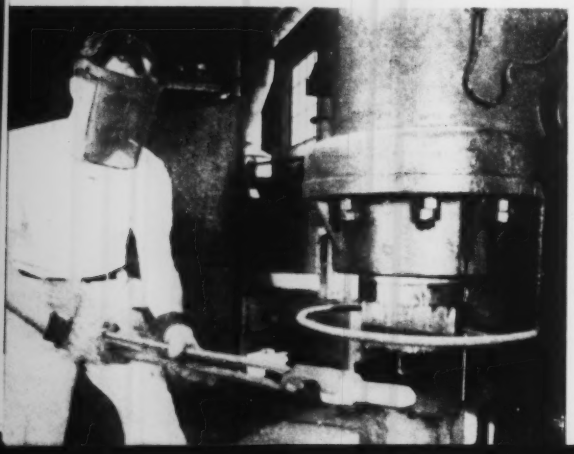
Jet engines create a demand for aluminum alloys of improved high temperature properties, including fatigue and creep. Despite extensive research, alloys are not yet available for efficient use at temperatures much higher than 400 to 500° F. British alloys RR58 (Cu 2.2, Mg 1.6, Ni 1.1, Fe 1.1, Si less than 0.25) and RR57 are used in elevated temperature applications. Alloy RR57 is being used for compressor blades in the temperature range of 500° F.

Husky Newcomer—A new aluminum alloy, designated as XA78S is reported by Aluminum Company of America to be 10 per cent stronger than the highest strength aluminum alloy now in use. This higher strength material may permit lighter airframe construction in the future, since less metal will be needed to meet structural strength requirements.

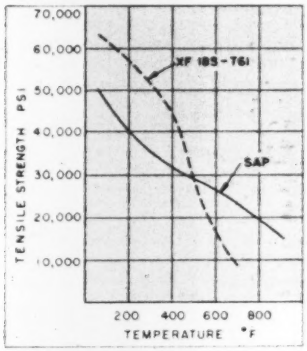
Main alloy composition is the same for both 75S and XA78S. They are both of the aluminum-zinc-copper-magnesium type. However, XA78S is approximately 10 per cent higher in tensile and yield strength than 75S with about the same elongation and fatigue properties.

A new hard coating for aluminum is being used in applications where long-wearing surfaces coupled with light weight are essential. The new wear resistant surfaces are anodic oxide coatings which form an integral part of the metal they protect. The coating has been used in applications involving wear, abrasion, heat erosion and corrosion in such parts as gears and pinions, turbine blades and nozzles.

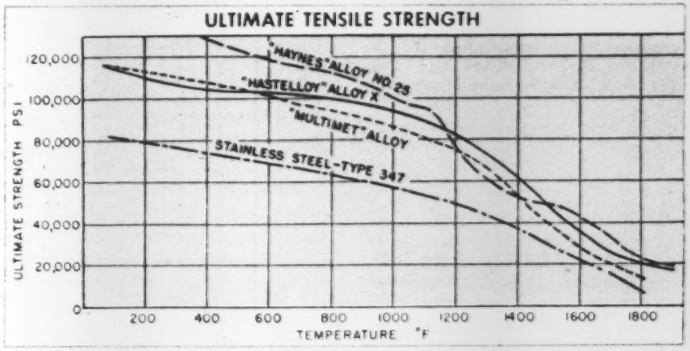
Foreign Talent—A Swiss development, now being studied in this country, consists of a strong high temperature aluminum alloy made by sintering aluminum powder. This new sintered aluminum powder (called SAP) shows potentialities for use at 800°F, a 400 F increase over the best commercial high temperature aluminum alloy. SAP is produced by cold-pressing aluminum powder of fine particle size into briquettes, sintering at 900 to 1100°F, followed by further hot pressing and finally extruding the



Ingots of pure vanadium are readily hot forged into billets for rolling. Material may be the first choice for structural parts where flectural rigidity is big factor



Comparison of high-temperature tensile properties of Sintered Aluminum Powder and XF18S-T61 leading high temperature, age hardenable aluminum alloys favors SAP



Alloy X developed for high temperature service contains iron, nickel, chromium and molybdenum. Ultimate tensile strength compares favorably with regular alloys

material into rods. These rods can be further cold or hot worked into sheets, shapes or drop-forgings.

Exposure to temperatures as high as 900° for as long as 100 hours results in little or no change in the room temperature tensile properties of SAP parts. This is believed to be due to the effect of the oxide envelope around the particles preventing grain growth and recrystallization.

Facts Speak—A recent Naval-Research Laboratory report[12] states that SAP has a 100-hour stress rupture strength at 600°F of 13,800 psi and a 1000-hour stress-rupture strength of 12,000 psi. At the same temperature, one of our best high temperature age hardenable aluminum alloys, RR58 (XF18S-T61), ruptures in one hour at a stress of approximately 10,000 psi.

The material has a low creep rate at 600°F at stresses as high as 15,000 psi. It is reported that the strength and creep resistance of SAP at 600°F are as much as two to five times greater than those of conventional aluminum alloys. In addition, the fatigue properties of SAP are generally superior to those of aluminum alloys at temperatures greater than 400 to 500°F.

Ceramics with Metals

Life of components made from austenitic stainless steels, Inconel and other high temperature alloys is materially extended by the use of ceramic coatings. Two benefits may be realized: In some applications it is possible to replace scarce high temperature alloys with ceramic coated low alloy steel. Another use is to extend the service life of high temperature alloys which are in short supply. In aircraft applications, ceramic coatings protect parts against intergranular corrosion at temperatures of 1500 to 2100°F. Their thermal expansion coefficient over the temperature range in which they are used must be as close as possible to that of the metal to which they are bonded. Coatings must also be resistant to thermal shock.

Super-refractories consisting of sintered combinations of ceramic and metals are under investigation for high temperature applications. Since the physical properties of these materials extend into the higher ranges of thermal and mechanical shock resistance, they offer possibilities for use in equipment requiring physical stability at temperatures above 1800°F.

Among the most promising of the cermets, a designation used for these ceramic-metal combinations, are cemented titanium carbide compositions. These metal bonded titanium carbides exhibit strength properties up to 1800°F, oxidation resistance and thermal shock behavior. These qualities make them potentially useful turbine blade materials at present temperatures and at the anticipated higher operating temperatures for the future. One promising composition uses nickel as a binder.

Increasing interest in higher temperatures for atomic power producing units also focusses attention on the ceramic field of high temperature materials. For some applications, present day alloys are not compatible with nuclear requirements of materials of construction for nuclear reactors. The nuclear metallurgist is thus looking at nonmetallics or metal-ceramic combinations, same as his cohorts in the jet engine field in their search for turbine blade materials to operate up to 3000°F.

REFERENCES

1. K. H. Kingdon, General Electric Review—August 1948.
2. R. H. Thieleman, J. C. Mertz and W. P. Eddy, Jr.—"Trends in Gas Turbine Engine Materials." A paper presented at the annual meeting, Society of Automotive Engineers. (Jan. 1952)
3. J. W. Freeman, E. E. Reynolds, D. N. Frey and A. E. White: No. 21 Preprint A.S.T.M. (June 1949)
4. C. E. Swartz *Metal Progress* (Aug. 1950)
5. Technical Data Bulletin 4.303—Fansteel Metallurgical Corp.
6. J. J. Harwood, *Products Engineering*, (Jan. 1952)
7. W. L. Finlay and M. B. Vordahl, *Metal Progress* (Feb. 1952)
8. TAM Metallic Zirconium—Technical pamphlet of the Titanium Alloy Mfg. Division, National Lead Co.
9. B. Ostrof and E. E. Thum, *Metal Progress*, (July 1952)
10. A. B. Kinzel, *Metal Progress* (Sept. 1950)
11. Described in a paper by W. J. Kroll at the 97th meeting of the Electrochemical Society, Cleveland.
12. J. J. Harwood, "Powder Metallurgy for High Temperature Applications" Monthly Research Report of the Office of Naval Research (July 1952)

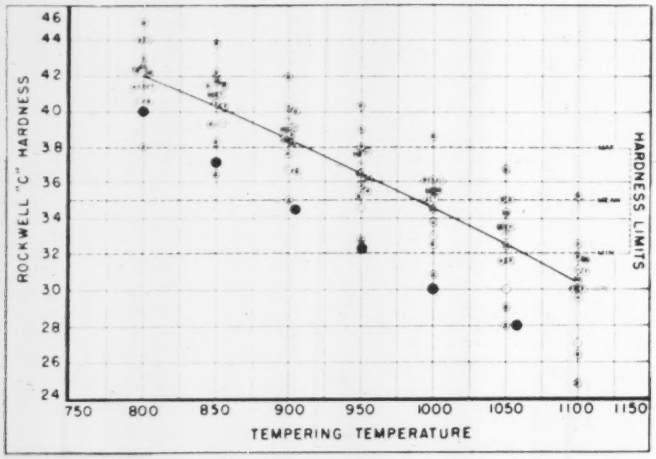


Fig. 1—Correlation of the Rc hardness and tempering temperature for 13 standard alloy and 50B40 steel bolts. The black circles indicate boron steel

LATEST American Iron & Steel Institute list of constructional alloy steels includes 40 boron steels. Most of these are permitted for nonmilitary use as the nickel content does not exceed 0.60 per cent in the carburizing grades, 0.40 per cent in the heat treating grades, and molybdenum content does not exceed 0.15 per cent in any grade.

International Harvester Co. is using 50B00 series chromium boron steels in large volume production, in carbon contents of from 0.15 to 0.60 per cent. Steels previously used were 4800, 4600, 8600 series steels.

CONSIDERATIONS FOR CARBURIZATION

Carbon Content

By A. S. JAMESON
Supervisor, Metallurgical Research Laboratories
Manufacturing Research
International Harvester Co.
Chicago

New steels are successful in heat treated parts such as springs, axle shafts. Saving in nickel and molybdenum is high. Problem is in low-carbon carburizing and high carbon grades

APPROXIMATELY 79 per cent of the nickel and 70 per cent of the molybdenum previously used in heat treated parts are now saved by the substitution of boron steels at International Harvester. The new steels are being used successfully for parts such as axle shafts, steering knuckles, leaf springs, heavy coil springs, connecting rods and, to some extent, for case hardened gears.

In adopting boron steels to its operations, the Steel Division of the company was successful in producing heat treating grades (0.35 to 0.65 carbon) chrome boron steels which met the minimum hardenability requirements of steel previously used. No difficulties were experienced in forging, machining, or heat treating, although it was sometimes necessary to lower the tempering temperature. Finished parts proved satisfactory in both laboratory tests and field performance.

The application of boron steels to the manufacture of case-hardened gears, however, presented some difficulty. The boron steels worked out satisfactorily with certain gears now in production. But others, are still being made of other alloy steels, although in nearly all cases the alloy content was kept within government restrictions without difficulty.

Little "Skin" Effect—Principal reason for difficulties in fabricating case-hardened gears from boron steels is that boron has a great effect on the hardenability of low-carbon steels corresponding to the core and, little if any, effect upon the hardenability of the 0.90 per cent carbon zone in the outer portion of the case. This sometimes led to excessive distortion and, in a few cases, to a lack of sufficient hardness in the case portion of large gears and pinions. On the other hand, boron is effective in increasing the hardness in the lower layers of the case where the carbon content is about 0.40 to 0.70 per cent.

Initially, boron steels were used to replace the standard alloy steels on the basis of equivalent hardenability as determined by the end quench test, or by calculations from chemistry using published factors. It has since been recognized that aside from the addition of boron, certain heat treatment problems arise from changes in the alloy content of the steel especially where the nickel content is lowered or eliminated.

Many of the parts were previously made from chromium-molybdenum steels (modified 4100 series) and in these cases the change to chromium boron steels did not present any insoluble problems. In most cases their substitution left heat treatment practices unchanged.

Heat Treating Changes Little—The changeover in

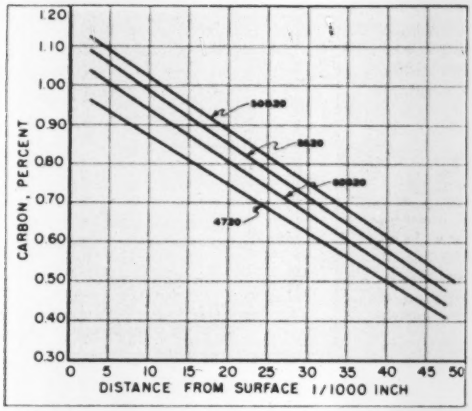
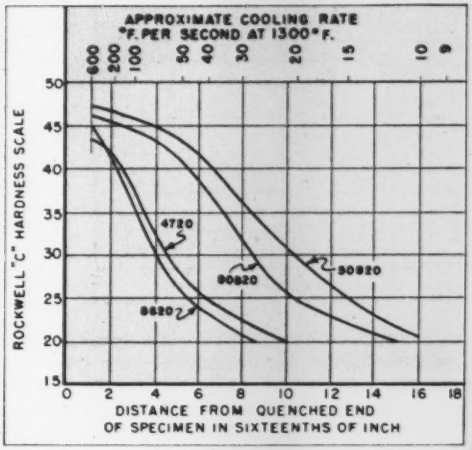


Fig. 2—Carbon content of 50B20 and alloy steels at various distances from surface of carburized 1-inch cylinder

Fig. 3—Chart shows comparative hardenability of 50B20, 80B20, 8620 and 4720 steel—uncarburized


APPROXIMATE COOLING RATE
°F. PER SECOND AT 1300° F.
600 200 100 50 40 30 20 15 10 8
ROCKWELL "C" HARDNESS SCALE
50 45 40 35 30 25 20 15
0 2 4 6 8 10 12 14 16 18
DISTANCE FROM QUENCHED END
OF SPECIMEN IN SIXTEENTHS OF INCH
4720
50B20
80B20
8620

Determines Boron Steel Behavior

bolts from the molybdenum (4000 series) was made without any change in heat treatment procedures, except that the tempering temperature on the boron steels was lowered to obtain the same hardness level. Boron, unlike some of the other alloys, does not impart resistance to a loss of hardness on tempering. The behavior of boron steels in tempering is then entirely dependent on the other alloys present.

This is illustrated in Fig. 1 which is the correlation of Rc hardness and tempering temperature for bolts made from thirteen standard alloy compositions and 50B40 steel. It would appear that, for the most part, the chromium-boron steel hardened to produce the same martensite content should be tempered about 50 to 100° F lower to obtain the same hardness level.

Where the Problem Is—It is in the use of low-carbon carburizing grades and the high-carbon grades of the boron steels where the major problem arises. This problem stems from two main sources. It's due to the elimination of nickel from the alloy composition and because the effect of boron on hardenability is influenced by the carbon content of the steel.

According to Grange and Garvey, boron does not increase the hardenability of hypereutectoid steel. Rahrer and Armstrong also concluded the hardenability effect of boron was negligible at about the eutectoid composition.

Ordinarily, carburizing practices employed in the heat treatment of gears and roller bearings are not designed to control the surface carbon content.

In roller bearing components the surface carbon content is controlled by the chemistry of the steel. Prior to the conservation of nickel, 4620 was the standard material. This contains an average nickel content of 1.80 per cent. Since the nickel conservation program, a change was made to 4720 and later to 8620. These have an average nickel content of 1.05 and 0.55 per cent respectively.

Nickel has the effect of lowering the solubility of carbon in austenite. Therefore in carburizing either by compound or by gas, nickel steels will have lower surface carbon content than nonnickel steels or rather steels containing carbide-forming elements. The relative effect of compound carburizing on 50B20, 80B20, 8620 and 4720 is illustrated in Fig. 2.

The Carburizing Approach—The method used to study the response to carburizing was to carburize 1-inch cylinders 3 inches long for 8 hours at 1700° F in a $BaCo_3$ energized compound and quench in oil followed by tempering in salt at about 1050° F. The bars were then turned off to successive depths of 0.005-inch at 0.005 intervals. The turnings were analyzed for carbon content. Table gives the chemical composition of the steels.

According to the data in Fig. 2 the average carbon content of the first 0.005-inch layer is higher for the 50B20 than for the 4720 when carburized under the same conditions of time and temperature. The 50B20 steel is carburized to a greater depth where criteria is distance to a certain carbon content.

The carbon content of the surface has some significance in bearing component manufacture. Lower carbon contents on the surface are preferred by bearing manufacturers. High surface carbon contents can cause grinding difficulties. High carbon content seems to be associated with a high austenite content in the case. This is undesirable in heavily loaded gearing. Even when austenite is not encountered, a high car-

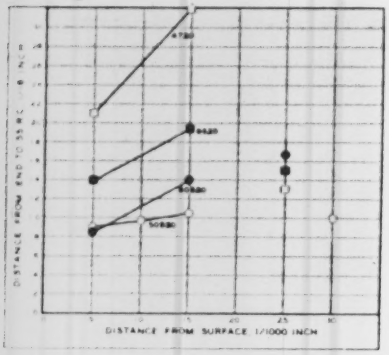
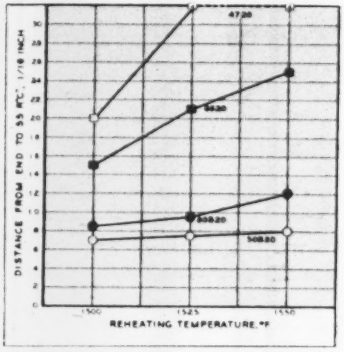


Fig. 4—Comparative hardenability of 50B20, 80B20, 8620, 4720 steels carburized and direct quenched

Fig. 5—Comparative hardenability of 50B20, 80B20, 8620 and 4720 steels—carburized and reheated at 0.015-in. from the surface



bon content is to be avoided in clash gearing.

Surface Carbon Unaffected—In these carburizing tests the boron-treated steels behaved in a manner that would be expected for their alloy content. It would appear that boron itself has no significant effect on the carbon content of the surface.

Where high carbon content is objectionable, the carbon content of the surface of the carburized steel can be controlled by the composition of the carburizing medium. A gas with a lower carburizing potential would produce a lower carbon content on the surface. The introduction of a diffusion time at the end of the carburizing cycle will produce the same effect.

In order to obtain a clear picture of hardenability of a carburizing steel it is necessary to know the hardenability at various carbon levels. Carbon contents ranging from the carbon content of the core, say 0.2 per cent to 1.10 per cent, are present in a carburized case.

Carburizing Changes Picture—Changing over from a standard alloy steel to the boron steels with their lower alloy or their changed alloy content on the basis of equivalent hardenability is not advisable. The 50B20 boron steel has a comparable hardenability with 80B20, 8620 and 4720 steels in the uncarburized condition (Fig. 3). However, in the carburized condition it is inferior both when direct quenched from the carburizing cycle and when reheated and quenched—especially when compared with 4720.

It was previously noted that the recorded hardenability of different alloys and alloy combinations is more markedly affected by the austenitizing time and temperature at high carbon levels, and that the hardenability factors are not applicable to nickel at high carbon levels. It is obvious by examination of Fig. 2 and 5 that predication of the carburized hardenability from the uncarburized hardenability is not practicable.

It was found necessary in International Harvester heat-treating operations to increase the H value of the quench in order to offset the lower case hardenability of carburized 50B00 boron steels. Of course, case hardenability could be increased by holding case carbon content to a lower level by carburization.

The Distortion Problem—Aside from the problem concerned with the elimination of nickel as an alloying element, there is a distortion problem arising from the relative effectiveness of the boron treated steels at different carbon levels. There is a tendency for distortion of gear teeth when the boron steels are heat-treated by direct quenching without fixturing. This can be corrected to some extent by fixturing or by marquenching. However, the greater hardenability of the carburized boron steel in the intermediate zone between the case and the core was found to be advantageous where deep hardened zone is desired.

The use of boron steels for the conservation of chromium in ball bearing steels is not at the present time a critical consideration. It will suffice to state that boron did not increase the hardenability of 1 per cent carbon steels with alloy composition of 0.25 per cent molybdenum, 0.50 per cent chromium and 0.35 per cent chromium plus 0.25 per cent molybdenum more than 1/16-inch at 60 Rc. This is no more than a 30-point increase in manganese would accomplish.

Where the carbon content of the chromium-molybdenum combination is held at 0.75 carbon level, however, the increase is appreciable. The heat treatment of such a combination while not changed with respect to temperatures can be accomplished in a shorter time cycle. The spheroidizing annealing cycle is also greatly shortened over that required for 52100 steel.

Chemical Composition of Boron, Standard Alloy Steels Used in Carburizing and Hardenability Tests

Steel Symbol	Element and Percent						
	C	Mn	Si	Cr	Ni	Mo	B
50B20	24	93	25				0012
80B20	24	72	30	33	29	09	0011
8620	20	70	23	49	51	20	Nil
4720	25	65	32	52	1 14	20	Nil
*4720	19	64	32	46	1 02	22	Nil

* Used for data in Fig. 2, 3, and 4 only
Grain size of these steels was classified as fine

BIBLIOGRAPHY

Knowlton, H. B., Boron Steels, S.A.E. ISTC Division VIII, Report SP-81 and *S.A.E. Journal*, Aug., 1951.

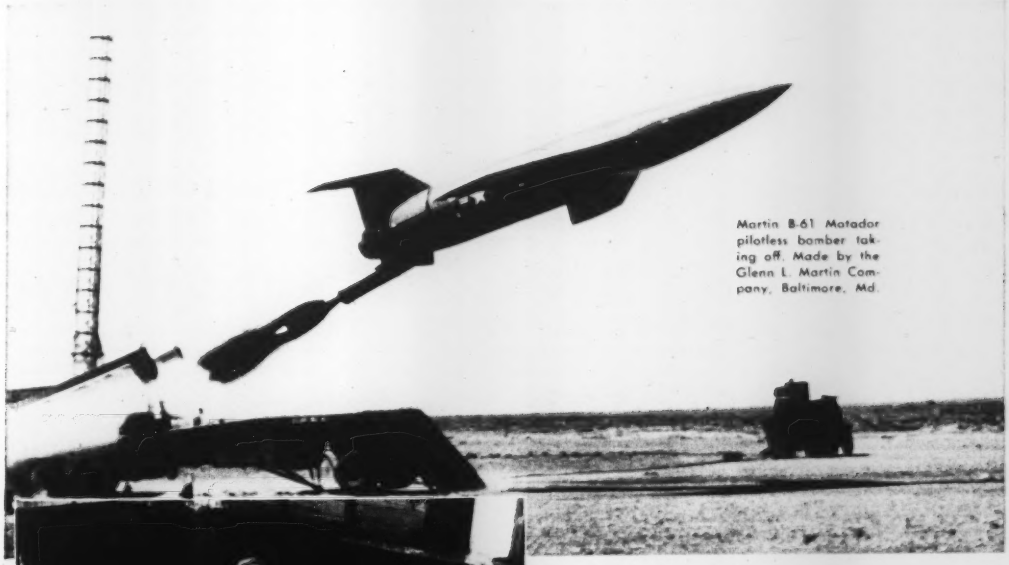
Knowlton, H. B., An Investigation of Boron and Other Low-Alloy Steels, Part I, II and III, *Steel Processing*, Feb., Mar., and April 1952.

Graham, J. D., Heat Treating Boron Steels, STEEL, May 12, 1952.

Grange, R. A. and Garvey, T. M., Factors Affecting the Hardenability of Boron Treated Steels, Trans. A.S.M. Vol. 37—1946.

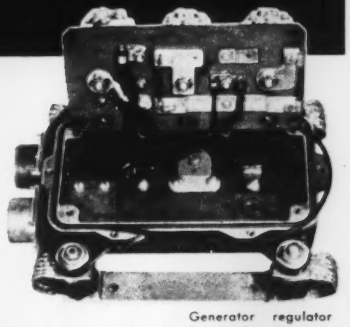
Rahrer, G. D. and Armstrong, D. C., The Affect of Carbon Content on the Hardenability of Boron Steels, Trans. A.S.M. Vol. 40—1948.

Jameson, A. S., Hardenability Behavior of Carburizing Grades of NE and Automotive Alloy Steels, May 7, 1945.



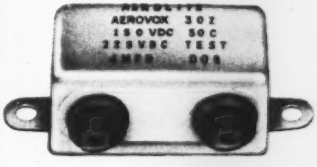
Martin B-61 Matador pilotless bomber taking off. Made by the Glenn L. Martin Company, Baltimore, Md.

Jeep almost completely submerged. Can be operated in this position at about 9 miles per hour. Made by Willys-Overland Motors, Inc., Toledo, Ohio, for the Armed Forces.



Generator regulator for the 24-volt system of the submersible Jeep. This is completely waterproof and highly resistant to corrosion and fungi. Produced by The Electric Auto-Lite Company, Toledo, Ohio.

Illustrated are two of the many types of capacitors and filters made by Aerovox Corporation, New Bedford, Mass.; an important capacitor supplier to both Electric Auto-Lite and Glenn L. Martin. The unit above is the filter capacitor used in the generator regulator of the submersible jeep while the unit at the right is used in the pilotless bomber.



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The dramatic pictures on this page show two important special applications of Aerovox capacitors. One is the Martin B-61 Matador pilotless bomber. It contains an Aerovox capacitor, which has to withstand the terrific acceleration and speed of the craft. The other is the submersible Jeep. Its 24-volt electrical system is completely waterproofed, and includes Aerovox filters and capacitors for suppression of radio interference. Revere not only supplied copper and brass strip for the capacitor cases, but collaborated closely in setting up specifications, and in addition worked on a welding problem. In regard to the latter, an Aerovox Project Engineer wrote: "We have had much better welds." . . . Revere is always glad to collaborate on problems concerning copper and its alloys, aluminum alloys, and electric welded steel tube. Call the nearest Revere Sales Office.

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Nondestructive

QUALITY WITH

Setting up a portable x-ray unit for inspecting aircraft parts. Courtesy Picker X-Ray Corp., New York

Rising costs make it important to detect component defects before manufacturing time is wasted. Every physics principle is used in tests that make interiors as visible as exteriors

"WASTE NOT, want not", this old pioneer adage never carried more meaning than it does today.

Today, many industries are faced with countless production problems, generated by material and component shortages. These, coupled with rising production costs, have caused many industries to turn to nondestructive tests to guarantee not only the quality of the end items, but also to avoid wasting valuable manufacturing time on raw materials or components containing inherent defects.

The increasing tempo of our present military-civilian production economy has brought with it many detailed inspection problems. All add up to one simple statement: Today's inspection methods and standards must assure dependable service. To do this, they must give reliable information as to the probable service performance. Since nondestructive tests have the advantage of testing parts which actually go into service, industry is looking to them more and more as a solution to the problem of insuring adequate service life.

Indicates Ills, Not Cures — Too often, those unfamiliar with the basic nature of nondestructive testing expect it to work miracles. Through some form of black magic, the nondestructive test is expected to substitute for the lack of specific knowledge of the causes of service failures. Such misconceptions generally lead to misapplication of the tests, and to failures which are not the fault of the test method.

Nondestructive tests detect and evaluate defects, or measure the strength or serviceability of materials, parts, and assemblies, without damage to the test objects. They differ from proof or coupon tests. They also differ from ordinary measures of industrial process control. Most of them involve far more than external visual inspection of the exposed surfaces.

New Surface Made Visible—In most cases, nondestructive tests are designed to reveal properties and dimensions of the interior of the test object, to make the interior visible as a new external surface. Nearly every basic principle of physics is used in the design of nondestructive tests.

In most nondestructive tests, it is necessary to detect and evaluate flaws and defects, or to determine strength and serviceability, by indirect methods. These generally involve the measurement of a different but correlated property. Nondestructive proof of the existence of a defect does not in itself measure the influence of that defect upon the strength or serviceability of the test object. This determination must ordinarily be made by destructive tests on specimens both free from defects and containing defects of each basic type, in each critical location.

In nearly all engineering materials, there is a serious lack of specific information on the influence of material and fabrication defects upon strength or serviceability. The nondestructive test cannot supply this knowledge.

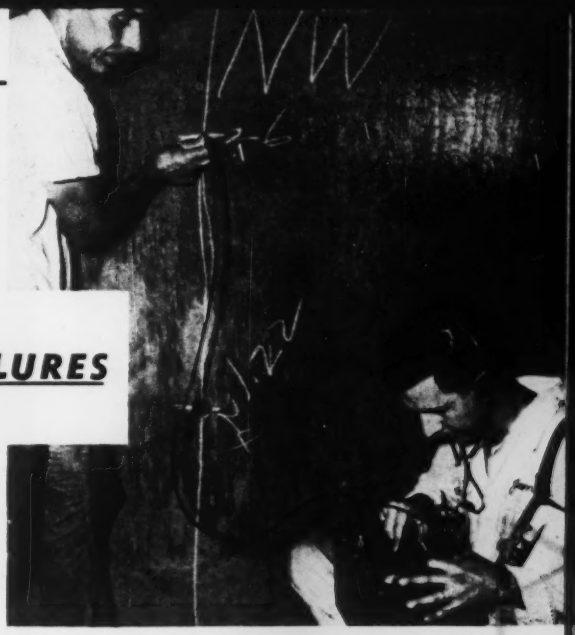
Correlation Vital—A necessary prerequisite to a reliable nondestructive test is a proved correlation between the property actually measured by the test, and the strength or serviceability property being predicted from the measurement.

Where such correlations are not fully established, or where several factors influence the relation between the measured property and the property being

Testing:

FEWER END-PRODUCT FAILURES

By SAMUEL A. WENK
Battelle Memorial Institute
Columbus, O.



Ultrasonic Audigage is being used to check wall-thinning due to corrosion on a pulp mill sulphate digestor. Courtesy Branson Instrument Co., Stamford, Conn.

predicted, evaluations based upon the experience and judgment of skilled interpreters become a vitally important feature of the nondestructive test method. To obtain the necessary data to establish these correlations, and then to design and develop a reliable test method based upon such correlation, is usually difficult and frequently costly.

Failure to demonstrate the reliability of such correlations before applying and evaluating nondestructive tests can be far more costly. This element of doubt, based upon lack of specific knowledge, has cost the whole American industry millions of dollars.

This view shows clearly how Magnaflux dry powder indications (center area) locate cracks—in this case an engine block casting. Courtesy Magnaflux Corp., Chicago

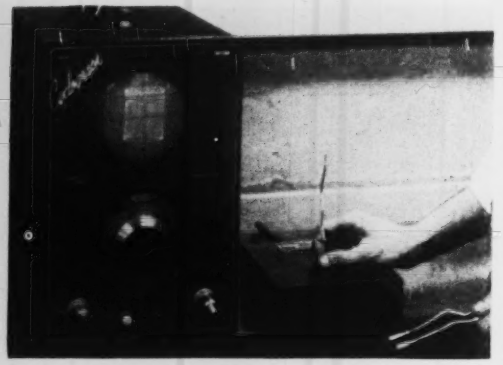
In most cases of doubt, inspectors using nondestructive test methods tend to be conservative, particularly in the absence of reliable service data. In too many cases, parts rejected because of defects shown in the nondestructive tests, have shown no weakening because of the defects when subjected to proof tests.

What the Test Does—Ultimate purpose of the nondestructive test is to detect and evaluate defects, or to predict the strength and serviceability of the part under test. Flaws or defects may be inherent in the material, or may arise during processing or fabrication of the material of which the part is constructed. Rarely are these measured directly by nondestructive tests; instead, correlated properties are measured. They include: Geometric and mechanical properties, properties of structure and composition, absorption and reflection properties, electrical and magnetic properties, and thermal properties.

These properties may be measured absolutely or differentially—for local or general regions—or for discontinuities in the test object, and in various combinations with each other.

The Influencing Factors—To evaluate nondestructive test methods, it is important to discriminate between the reliability of the test method (in revealing flaws and measuring physical properties) and the reliability of the judgments of the inspectors.

Lack of specific data, operating experience, or good judgment, may seriously influence the inspector's conclusions, even when the nondestructive test method is providing excellent information concerning the



In this instance, the Cyclograph, a magnetic induction type of nondestructive test, is used to sort heater elements. Courtesy J. W. Dice Co., Englewood, N. J.

condition of the test object. Consequently, it is not good economy to place useful nondestructive testing equipment in the hands of inexperienced inspectors.

Most nondestructive tests depend upon mechanical measurements or upon a flow or transfer of energy for transmission of information concerning the object under test. The energy must usually be supplied from an external source, such as an x-ray tube, a magnetizing coil, an ultrasonic generator or a mechanical force. It may be distributed rather generally through the object inspected, as with a broad x-ray beam, or concentrated in a narrow beam, as in ultrasonic testing.

Energy Response Important—The source and type of energy must be selected so that the distribution of the energy within the test object is modified by the presence of defects or by variations in the properties being tested. Often, only a small portion of the incident energy is so affected. For this reason, very sensitive detectors of variations in the energy distribution are required.

The small variation energy output in the pick-up or detector unit must then be indicated or recorded by sensitive instruments or processes. Finally, the indications must be interpreted, usually by a skilled inspector.

Many proposed tests are worthless because the significant defects or variations in properties in the test object do not affect or influence the energy distribution sufficiently at the point of detection. In other cases, the losses due to scattering or absorption of energy within the test object are so excessive that the energy level at the pick-up is too low for detection. Or, the indication of internal flaws or properties may be masked by the larger disturbing indications of surface geometry or of other regions closer to the detector.

Other Requirements—Critical feature of most nondestructive test methods is the pick-up. Often required sensitivity to flaw indications cannot be obtained, particularly in the presence of large disturbing effects emanating directly from the energy source, or from other sources of energy of similar nature. In other cases, coupling the pick-up to the energy field in the test object is difficult, and inefficient energy transfer results.

In a few cases, the feasibility of a proposed test may be limited by difficulties in amplifying and recording the low-energy output of the pickup devices. High-gain amplifiers or high-contrast processes often have a certain amount of inherent instability or drift which makes permanent calibration difficult, requiring constant recalibration or monitoring.

The final requirement, obviously, is that the test provide an indication or record which can be interpreted usefully, either in terms of the conditions within the test objects, or in terms of its serviceability. In some simple cases, the discrimination between acceptable and rejectable objects may be made an automatic function of the pick-up signal-level.

No Overall Test—Nondestructive tests must be designed and specified for validity and reliability in each individual application. The tests are specific to the problem involved.

There is no such thing as a general nondestructive test applicable to every kind of material, part, or structure, nor to all their functions or operating conditions. Instead, each must be based upon a thorough understanding of the nature and function of the part being tested and of the conditions of its service.

The nondestructive-test engineer must have full information concerning the service loads and conditions of use to which a part is to be subjected, in order to specify a useful test. He also needs, from operating experience or destructive tests upon the part, clearly established limits of acceptability or rejectability, or at least a statement of the accuracy to which service performance must be predicted in order that the tests be useful.

Furthermore, it is necessary to prove that the property which is to be measured by the nondestructive test is, in itself, a reliable measure of the strength or serviceability property to be predicted. Often an extensive series of controlled destructive tests is required in order to prove that the correlation is a complete and reliable indication of serviceability.

The Limitations—Even well-established methods of nondestructive testing now widely used in industry are subject to limitations. Radiography, for example, may reliably reveal porosity, shrinkage, inclusions, dross and misruns in castings, lack of penetration in welds, and similar defects. Rare are the cases in which the actual load for failure under service conditions or the service life can be predicted quantitatively from the x-ray examination, or even by destructively sectioning the parts.

Similarly, magnetic-particle inspection of ferrous materials reveals cracks and surface defects reliably. However, there are not very many cases in which the fatigue strength or the load necessary to produce static failure can be predicted at all from these data. It is generally sufficient, however, that the inspector

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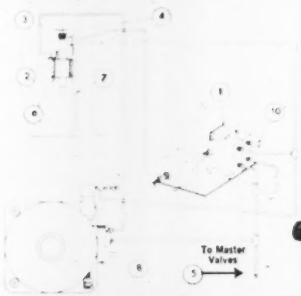

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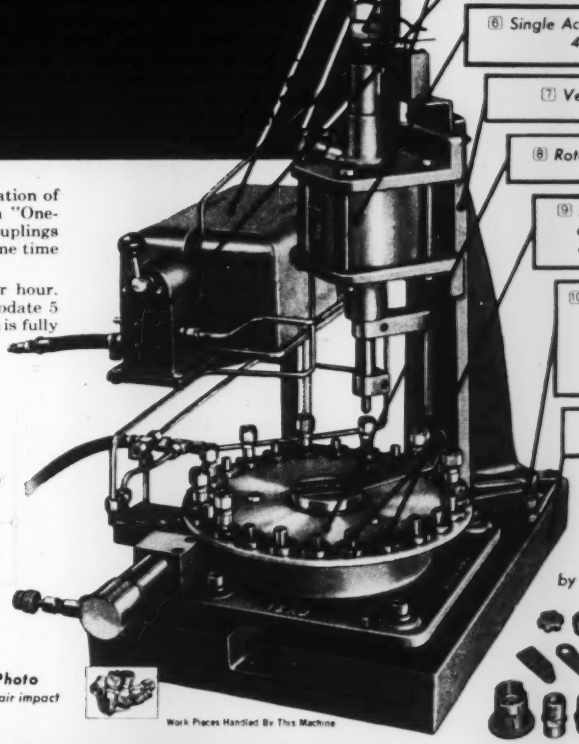
6. Single Acting Cylinder, 4" bore
7. Vertical Stand
8. Rotary Work Feeder
9. Alternate mandrels for two sizes of brass couplings
10. Air blast ejection of finished parts, by jet piped from second of two valves in timer
11. Universal Base



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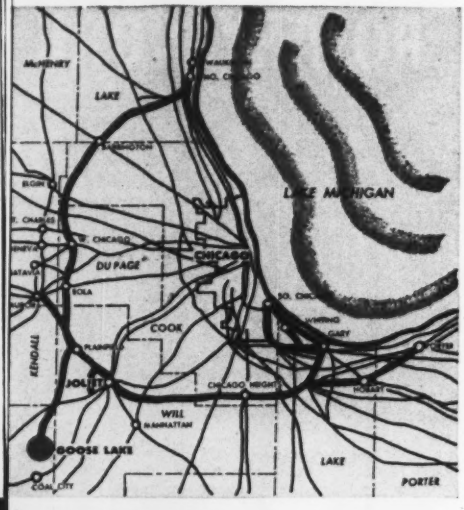

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The Illinois Clay Products Company, Goose Lake Plant, is located near Joliet, Illinois—only 55 miles from Chicago. Above is a map showing the excellent shipping facilities provided by the Elgin, Joliet & Eastern Railway—the Outer Belt Line.

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At Goose Lake, extensive deposits assure an ample source of fire clay for many years ahead. This large modern plant employs all the latest methods in the manufacture of refractories and insulation and many advanced and special techniques have enabled us to supply better products than are obtainable elsewhere.

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Illinois Clay Products Company

SINCE 1911 JOLIET, ILLINOIS

The large steel roll in the foreground is being checked for defects with the use of the ultrasonic reflectoscope. Courtesy Sperry Products Inc., Danbury, Conn.

Another nondestructive test method is the Zyglo used here to inspect tractor parts. A fluorescent penetrant shows up the flaws. Courtesy Magnaflux Corp., Chicago

knows a fatigue crack or stress concentration will lead to premature failure under repeated stressing, in order to reject the part for such service.

The Engineers' Role—The engineer specifying or designing nondestructive tests must recognize certain geometric limitations. Some test methods require access to both sides of the part, material, or specimen which is under test. Other methods can be modified for use as "one-side" tests. Some test methods can be applied to parts of almost any shape or size. Others are limited to areas with reasonably flat surfaces or with constant thickness section. A few types are applicable only to specimens of identical geometry. Others are limited, at present, to certain kinds of materials, or to parts with definite thickness limits. Some allow large areas or volumes to be inspected in a single operation. Other methods require scanning of each small area.

Special care should be exercised in specifying limits of sensitivity and accuracy required or expected in a nondestructive test. The sensitivity of every type of nondestructive test is limited. Sensitivity adequate for excellent testing on one part may be totally inadequate for another test object.

Limit the Functions—In nondestructive tests, it is desirable to limit the number of functions or properties to be measured to those of practical importance in production or service. For example, a particular part might be weakened for service by any one or by a combination of several causes. These might include improper material, wrong heat treatment, internal defects. No single nondestructive test should be expected to measure reliably all of these properties. Often a separate type of test is required for each general type of defect or cause of weakening.

The same reasoning holds true for service damage. Corrosion, repeated stressing, wear, impact, surface destruction, and many other factors may contribute to service failures of parts which were originally sound. Usually a separate method of inspection may be required for each of the types or locations of service defects.

Pyramided Tests Raise Costs—The internal nondestructive tests for service damage may vary with the types of defects. If specific tests for each of the causes of failure are pyramided into large, complex nondestructive tests, costs would ordinarily be unreasonably high. The designer, process engineer, and operating engineer should determine which properties are of practical limiting importance in production or service. The test engineer should reserve for nondestructive testing only those properties which cannot be more economically or reliably controlled through other methods of control or inspection.

Today, nondestructive testing has grown into a well established field which is serving a large cross-section of American industry. Many plants now subject all critical incoming material to nondestructive tests. Others are utilizing them to meet rigid process-control standards.

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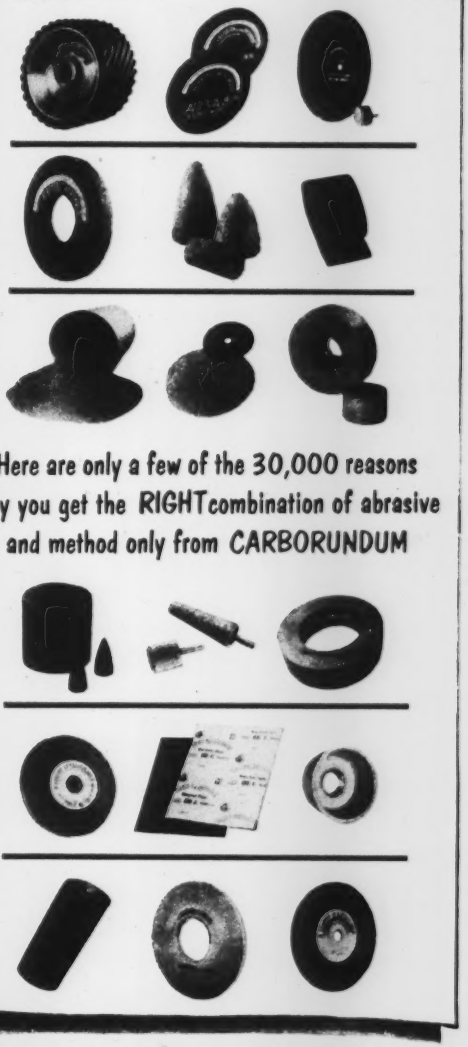

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INDUSTRIAL RESEARCH, once described by GM's C. F. Kettering as "simply trying to find out what you are going to do when you can't keep on doing what you are doing now" goes a lot deeper these days than that homely analog would suggest.

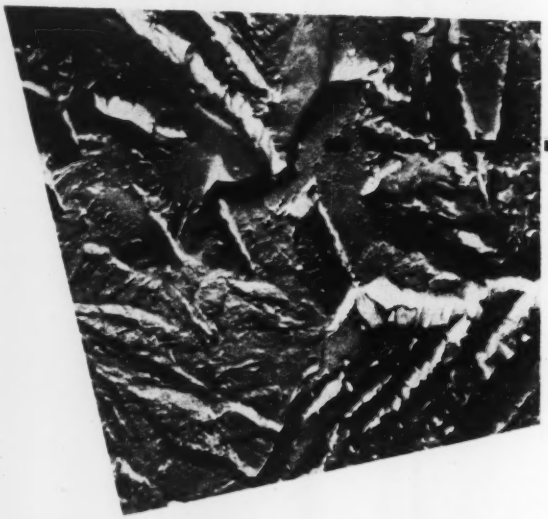
Research is a sort of business life insurance that guarantees companies will keep up with scientific advances and have new products and improvements in old products ready when they are needed.

Automotive research is a fundamental measure of many phases of industrial progress. Over the years, it has spread through a broad range, all the way from assembly line trouble-shooting on up to the higher echelons of long-range basic investigations into materials and processes. Certainly, the automotive industry can be credited with many of the important advances in metallurgy, either through its own research developments or through pressure exerted by the industry on its suppliers.

Research in metallurgy is an important part of the program being carried out in the General Motors Research Laboratories. The ultra-modern metallurgy building, recently opened, was the first completed structure in the research group at the new GM Technical Center, which is expected to be completed within four years.

Heads List—What do General Motors' metallurgists regard as their main research problems? No. 1 for automotive applications, is better corrosion resistance for painted and plated parts. Paramount to progress here is the development of accelerated test methods to simulate use exposure conditions. For defense applications, it is better high temperature alloys and the utilization of aluminum coated steel in some high temperature parts. For the long range viewpoint, it is learning to use those metals which are non-strategic and economically abundant in the U. S.

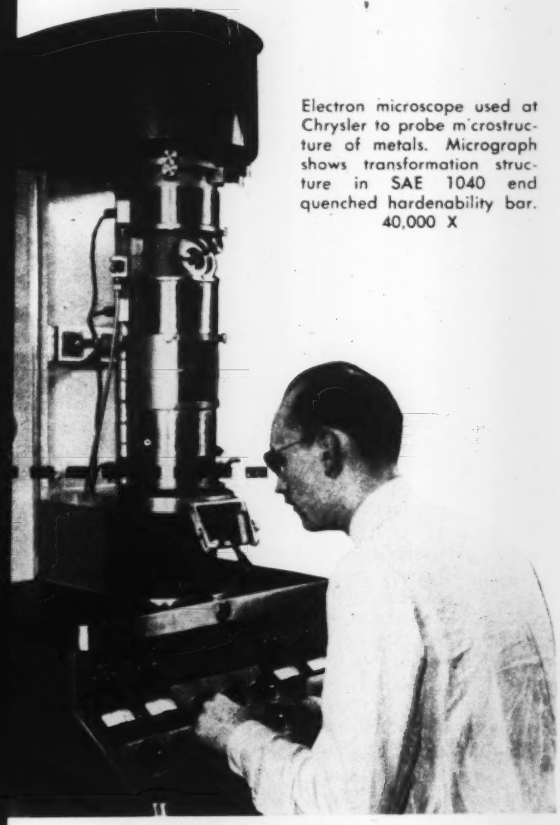
Conservation of scarce metals, substitutions for those not available, and better utilization and improved combinations of all metals constitute projects under constant investigation. About one-third of the research department's effort is in the direction of metallurgical consultation with various GM divisions on current production problems and in planning new products.



Project Breakdown—Dr. R. F. Thomson, head of GM's metallurgy research, states that about one-third of his projects have direct military application primarily in the field of jet engine materials. The other two-thirds have significance in both military and civilian fields.

A specific problem occupying much of the time of the metallurgical group is the uncovering of precision accelerated tests on metallic materials for wear resistance. While efficient wear testing machines have been in operation for at least 20 years, they do not exactly duplicate field service, so the effort is being directed toward finding some means of more closely approximating field conditions.

Simple Yardsticks Needed — In the selection of steels for automotive parts, much remains to be accomplished in the establishment of accurate and simplified measuring sticks. Chemical analysis, physical properties of test specimens, hardenability ratings and other laboratory-originated factors give an idea of the "character" of steel, but they do not tell how an automotive part made of that steel will perform in service. The effects of part size and shape, and



Electron microscope used at Chrysler to probe microstructure of metals. Micrograph shows transformation structure in SAE 1040 end quenched hardenability bar. 40,000 X

stresses resulting from processing operations and treatments are not observable in specimens tested in the laboratory.

This is a road block in metallurgy that has been bothering A. L. Boegehold, assistant to the general manager of GM research and formerly chief of its metallurgy department. In recent years he has initiated studies and discussions in the effort to do something about it. He points out that the complex relationships between the steel, its design, shape of the part, heat treatment and the endurance of the part in dynamic service make final selection of the material a tough job.

Would Be Great—Engineers frequently ask metallurgists to prepare simplified charts containing all the essential information for selecting the right steels for parts. Asking is easier than getting, but metallurgists are striving for the answer. If this project is successful, look for some major upheavals throughout all industry in specifying steels, far greater than those which followed the recognition of the hardenability factor.

In the field of ultrasonics, GM played a leading role in the development of the Sonigage for inspection of metals to discover internal flaws. Ultrasonics has many other applications, some already put to practical use—drilling and marking hard and brittle materials, cleaning intricate metal pieces, controlling air pollution from smoke and exhaust gases, etc.

Looking for Miracle—General Motor's researchers are looking for the miracle alloy to improve corrosion resistance of auto body steel. Thinking is along the line that it may be possible to find minor alloying constituents that will do for corrosion resistance what a small amount of boron in steel will do for hardenability.

A new type of precision corrosion test is used to study the corrosion resistance of bare steel specimens. The test differs from conventional tests in that the relative humidity in the test chamber is changed slowly during part of the test varying from about 10 per cent at 125° F to 100 per cent and back to 10 per cent in a period of about 8 hours.

Test specimens are also given a daily dip in a solution of 1 per cent sodium chloride, 1 per cent calcium chloride and 0.1 per cent sulphuric acid (by weight) as a part of the test cycle. This is to simulate corrosion conditions when automotive steels are exposed to an atmosphere which is composed in part of salt-filled slush generated on the streets of some cities during the winter. A small amount of sulphuric acid is used in the dip solution to adjust for sulphur compounds in the atmosphere.

Duplicates Service—Many tests utilizing humidity cycles have rapid transitions between the saturated and dried stages. Other tests have atmospheres very close to saturation humidity. This new test, by virtue of the greater range of relative humidity, more closely approaches service conditions than the saturated humidity test. Precision and reproducibility of results are assured by the use of weight loss as a criterion of corrosion.

The test gives a non-protective rust and thus measures the corrodability of steel divorced from the protective tendency of a rust layer. There is good evidence that the test evaluates various steels in about the same order as atmospheric corrosion.

Corrosion and Heat Resistance—Battling corrosion problems from another angle, GM researchers developed a method which produces sound aluminum coatings on parts of complex shape. A two-fold function is attributed to the new process: 1. As a corrosion or rust resistant coating for ferrous metals, aluminum-dip may in some applications replace zinc coated metals. 2. When diffused by heat treatment, the coating becomes a heat resistant material. This may conserve a number of strategic alloys now used in high temperature applications, especially in defense production.

In coating heat exchangers with aluminum in the pilot line at Harrison Radiator, they are dipped in an alkaline cleaner, washed in hot water, run through an acid pickle, rinsed in cold and hot water and then dried in a furnace until ready for coating. Next they are dipped four minutes in a bath of preheating salt

Microscope camera examines surface of a metal specimen studying its friction characteristics. Friction is one of the oldest problems but still has top research priority

at temperatures ranging from 1280 1400 F. Then they are transferred to an aluminum bath covered by a layer of salt flux about one-half inch deep, where they remain for 30 seconds or up to as long as 4-6 minutes for heavy coatings.

Next step in the process is the removal of excess aluminum. The part is returned to the preheat salt bath, slowly raised and lowered several times and then blown off with an air hose.

In the automotive field, several applications of the new aluminum coating are under test. Muffler inner tube assemblies, aluminum dip coated, outlast several times plain steel center tube mufflers. Exhaust tail pipes so coated withstand corrosion from heat and condensation longer than standard tail pipes. Longevity of steel hangers, spacers and paint rack fixtures used in various auto production operations is increased as a result of aluminum dipping.

Other motor companies, notably Ford and Chrysler, cannot be overlooked for they too are research minded.

Starting Out—The new Scientific Laboratory of the Ford Motor Co. is just now getting set up to tackle long range research problems related to the broad field of transportation. Operations will be divided into the fields of physics, chemistry, mechanics, metallurgy and electronics. Projects will range from investigation of new metals and alloys to the application of nuclear fission.

Dr. Andrew A. Kucher, director of the new laboratory, outlines the following broad fields for research activity:

1. Metallurgy and ceramics dealing with high temperature materials.
2. Chemistry dealing with fuels and lubricants.
3. Physics dealing with the composition, strength, and other physical properties of materials and involving thermodynamic, high pressure and high speed problems.
4. Electronics dealing with sensing and control devices.
5. The actual mechanics of putting things together and finding out how they run.

What about the future in materials? Ford researchers feel that the future will be limited to four metallic elements: Iron, aluminum, magnesium, titanium, and one semimetal silicon, for major construction.

The other elements are becoming more scarce and therefore too costly for use even as alloy agents. Copper, for example, is already more expensive than aluminum and may be restricted to electrical use only. Ford feels that the present position of titanium, costwise, will change in the future and may easily compete with stainless steel. It may also be used as a bright and corrosion-resistant coating, in the same sense as we now use chromium.

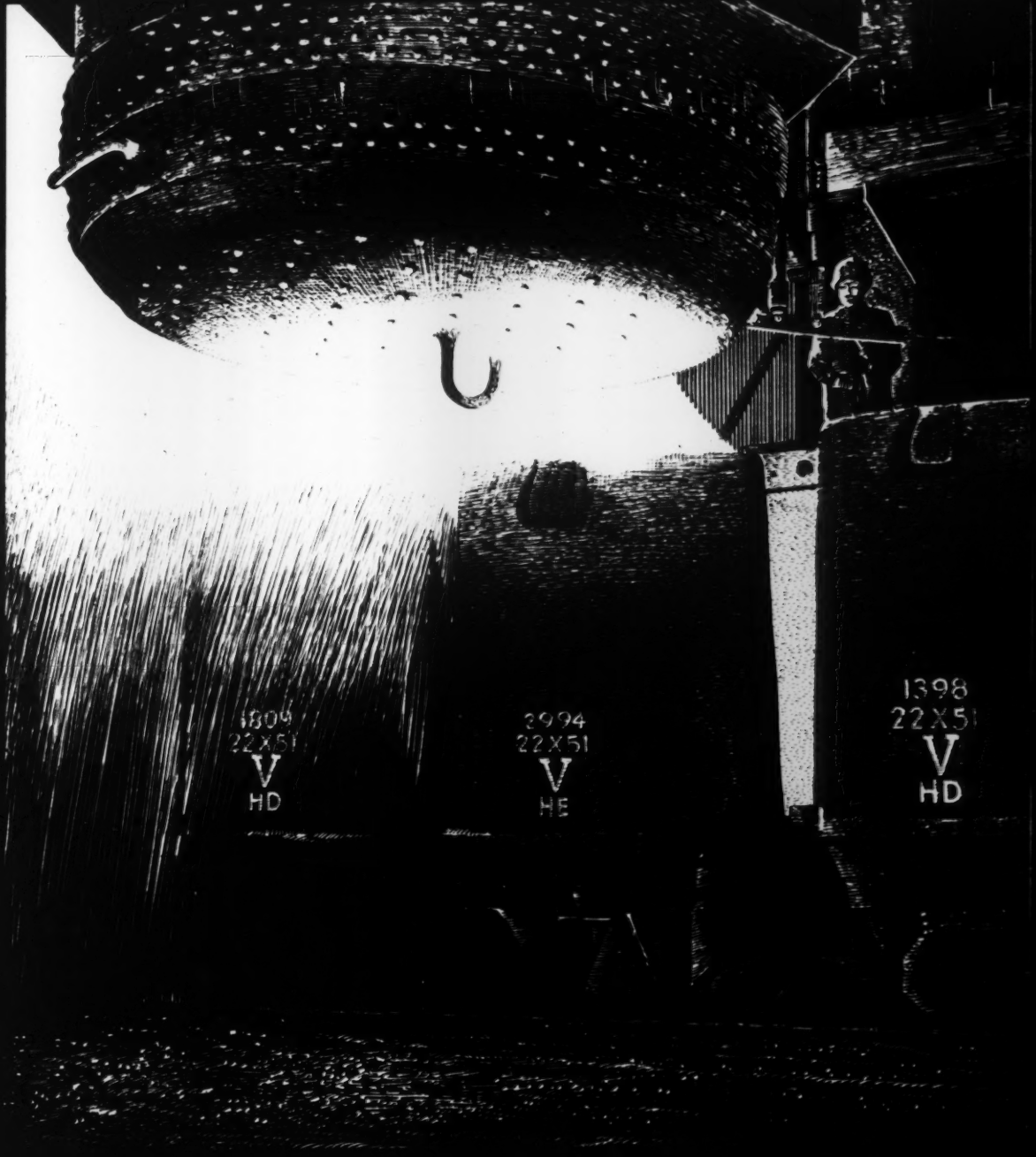
Long-Range Thinking—Looking further in the future, the company believes a number of technological advances are in the offing: Materials for use in the 2000 to 3000° F range will undoubtedly be developed. Major strides will be made in producing ceramic or ceramic metal compounds capable of standing rapid temperature changes. Metals, in general, will be produced to realize a bigger fraction of their theoretical strength. For example, the theoretical strength of present-day steels may be raised from 100,000 psi to about 1 million psi resulting in lighter and stronger structures.

Manufacturing research has long been active at Ford. Here experienced technologists are continually working on what to use in manufacturing and how to do it. Today, prime interest is in substitution of materials and design for use of substitute materials.

Practical researchers at Ford feel that reinforced plastics may offer a real challenge to metal for body stock. Steel industry's best insurance is low cost and continued technological advances in forming and finishing.

Methods for producing accurate castings and improvement in properties of cast metals are receiving a lot of attention in metallurgical research. Corrosion problems of automotive bright work, both as related to present day shortages of nickel for plating, and better bright finishes for the long pull are of great interest.

METALS IN THE JETOMIC AGE



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Spectroheliometer used in basic study of automotive paint failures. It aids researchers to determine which parts of the sun's rays are most injurious to finishes

New bearing designs and materials are given test runs to simulate actual service conditions. Technician adjusts bearing in a test machine that duplicates engine thrust

To the Hilt—Big research projects are also seething and bubbling in Chrysler Corp.'s research pot. Many basic problems studied by the Engineering Division are similar to those being examined by the other members of the automotive industry's Big Three. Competition is keen.

Chrysler's physical-chemical department is making good use of the electron microscope in metallurgical research. New techniques and methods are involved in preparing metallurgical specimens for study with the electron microscope. Most important of these techniques is the preparation of thin plastic replicas of the etched surface microstructure.

Appearance of metallurgical microstructures at high magnification is correlated with microstructures observed in the light microscope and with metallurgical treatments to form these structures. A file of standard electron metallurgical microstructures identifies electron micrographs in solving practical problems.

Details Stand Out—Use of the electron microscope in study of steel microstructures is being investigated on a co-operative basis by A.S.T.M. Subcommittee XI of Committee E-4 on Metallography, of which Chrysler's D. M. Teague is chairman. In specimens of eutectoid steel transformed at 1100° F, portions of the field which hitherto were unresolved by the light microscope are shown by the electron microscope to be pearlite of small interlamellar spacing.

These investigations reveal that eutectoid steel transformed at 950° F contains two distinctly different microstructures, namely, fine pearlite and upper bainite. The microstructure of the upper bainite formed at 750° F is completely resolved. It consists of separate cementite platelets distributed in a somewhat ordered arrangement in the ferrite matrix.

The microstructure of lower bainite formed at 500° F is completely resolved and consists of ferrite bands, containing small cementite plates parallel to one another. These bands are sometimes outlined by carbide plates.

Valuable Data—In brine-quenched martensite, even the small areas of retained austenite are clearly delineated by the electron microscope. This suggests that this technique may be of value in improving the accuracy and sensitivity of quantitative metallographic determinations of retained austenite. The structure of martensite tempered at 400°F is extremely fine and suggests that carbide particles may have started to precipitate at this temperature.

Microstructure of martensite tempered at 600° F is completely resolved and consists of small, discrete carbide platelets in a ferrite matrix. Martensite tempered at 800° F is similar, except that considerable coalescence of the carbide has occurred. There is a possibility that spheroidization might begin at this temperature. The electron microstructure of martensite tempered at 1100°F shows that spheroidization has progressed appreciably at this temperature.

A recent investigation of the Electron Microstructure Committee, which is a subject of a forthcoming report, concerns the isothermal transformation prod-

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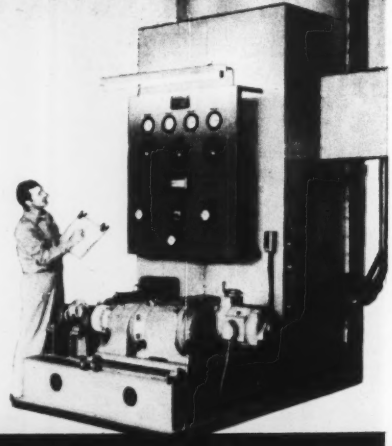

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ucts formed within the bainite range. Although a difference in appearance between lower bainite and upper bainite can be observed with a light microscope, the difference is much more pronounced when examined with the electron microscope, offering a new approach to this important problem.

Research at Chrysler is divided into four main groups: Mechanical, metallurgical, physical and chemical. The mechanical group has been subdivided into smaller groups which concentrate on engines, valve mechanisms, seals, lubricants, brakes, suspensions, steering and other chassis elements.

The other three activities develop experts but are not broken down into sub-groups. However, teamwork among these experts is important to progress.

A good example of this is the study of wear. The chemical group work with lubricants and study why they function as they do. The physical group study wear by radioactive methods. They plate one of the wearing surfaces with polonium, diffuse and then measure wear from the intensity of radioactivity on the mating surface. Finally, when an alloy is developed that looks good it is given to the engine division of the mechanical group for further test.

One has only to attend the ASM technical sessions of this Metal Congress to get first hand evidence of contributions automotive research is making to metallurgical knowledge.

Test Developed—A new type of end-quench bar developed specifically for measuring the hardenability of case-treated steels is disclosed in a report from GM research by F. X. Kayser, research metallurgist, R. F. Thomson, head of the metallurgy department and A. L. Boegehold.

The end-quench test is capable of accurately measuring the case and core hardenability of a carburized steel either at individual carbon levels or as a simple function of case depth. Data obtained on boron steels using the new test shows that case hardenability reaches a maximum at about 0.70 per cent carbon. Significant decreases in hardenability are found at concentrations in excess of this amount.

In a paper from Chrysler research, R. D. Chapman, research metallurgist and W. E. Jominy, chief research metallurgist, present data to show that the metallurgical phenomenon of temper brittleness has no effect on the endurance limit of the steel tested. In engineering applications, where a temper-embrittled steel is used, from these tests it appears that the endurance limit of the part will be unaffected even at temperatures below the transition temperature.

How Automotive Research Operates—In the GM organizational setup, each division of the corporation has full authority and responsibility for its own products. Each has its own engineering and research staff, concerned primarily with immediate problems of current production models. It is not practical for these groups to study many of the broad, fundamental problems which need consideration, because of the limiting factors of time, personnel and facilities. They have to concentrate on such things as why breakage may be occurring in some production part, why excessive wear is being encountered in some other component, or how some redesign can best be handled in manufacturing.

Still it is recognized that the long-range problems must be attacked, if not in the "line" organization then in the "staff" organization. This recognition early led to the establishment of the Research Laboratories Division, now well over 30 years old and at the moment moving into its fourth "home" since 1920, the vast GM Technical Center on the outskirts of Detroit. Yet despite its size, complexity and multitude of projects, the laboratories are only a small part of the entire research and development facilities within the corporation.

On the Team—Several other groups operate within the general staff to give technical assistance to the engineering departments of the production division. One is process development which actively studies methods, techniques and tools and in a much more general way than is possible in one of the plants. A styling section can well be considered a research group, investigating problems of appearance, color schemes, contours and decoration of products, whether they be automobiles, locomotives or refrigerators.

An advanced engineering section encompasses a large group of technicians whose work is the development and study of general engineering problems common to all or many of the operating divisions. Their work in general overlaps production engineering on the one hand and fundamental research on the other.

Other staff groups are concerned with research to greater or lesser degree. They include: Proving grounds, patent section, new devices section, produc-

Experimental diaphragm-type plating tank being used in electrochemistry research for testing various plating materials and techniques—a leading manufacturing problem

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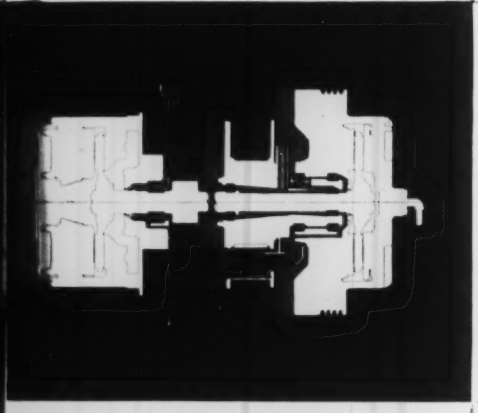

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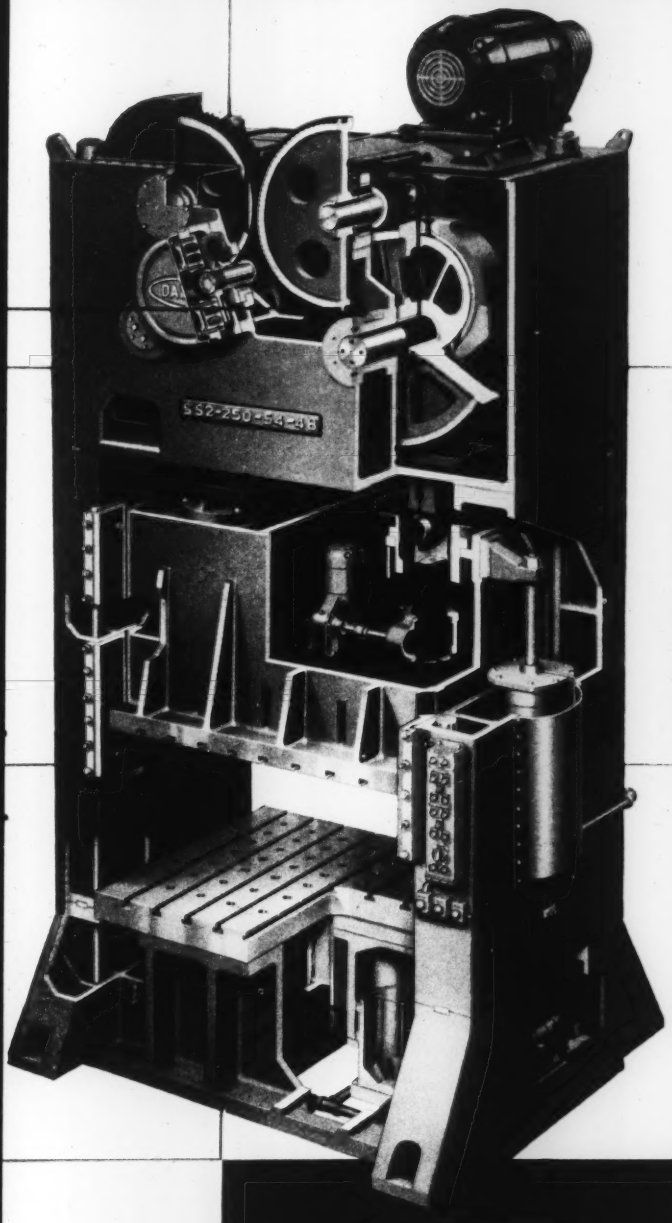

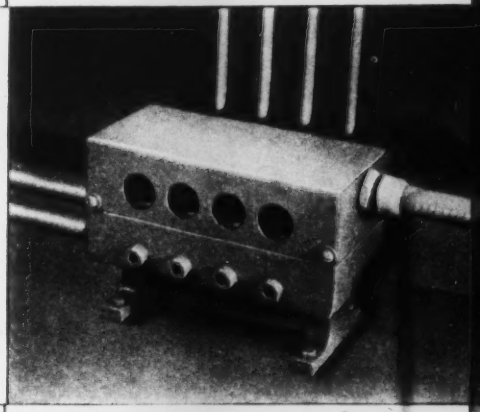

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tion engineering, industrial engineering and customer research. The new devices unit, for instance is a central office group which deals with outside inventors who submit their ideas to the corporation or to its divisions.

Long-Term Work—To consider in somewhat greater detail the Research Laboratories Division, it may be stated at the outset that it is concerned primarily with problems of the rather distant future. The division has no responsibility and no authority over products of any operating unit, but on the other hand developments which it brings to the commercially practical stage are free to any operating division which might want them.

Research Laboratories Division operates on a yearly budget from the central organization and is an expense item every year. No attempt is made to charge the cost of research to specific products which may be developed and used in operations. Neither is there any attempt made to credit the laboratory with the profits or other income from its successful findings. Work done is divided roughly in a ratio of 40-40-20; that is, 40 per cent long-range fundamental or basic research, 40 per cent shorter-term projects, and 20 per cent service requested by production divisions. Most of the important achievements come out of the first 40 per cent.

Organization for Research—Taking a quick look at the organizational chart, there is a general chemistry department, which in addition to doing most of the analytical chemical work for other departments, carries out studies on paints, lacquers and other finishes. An organic chemistry department is concerned with internal combustion engine fuels and combustion processes; while an electro-chemistry department is active in studies of electroplating, rubber, synthetic elastics and plastics. One of the most important subdivisions, the metallurgical department, was the first to move to the new Technical Center.

A physics-instrumentation department is concerned with work in pure physics research, electronics and improvement of a wide range of instrumentation devices.

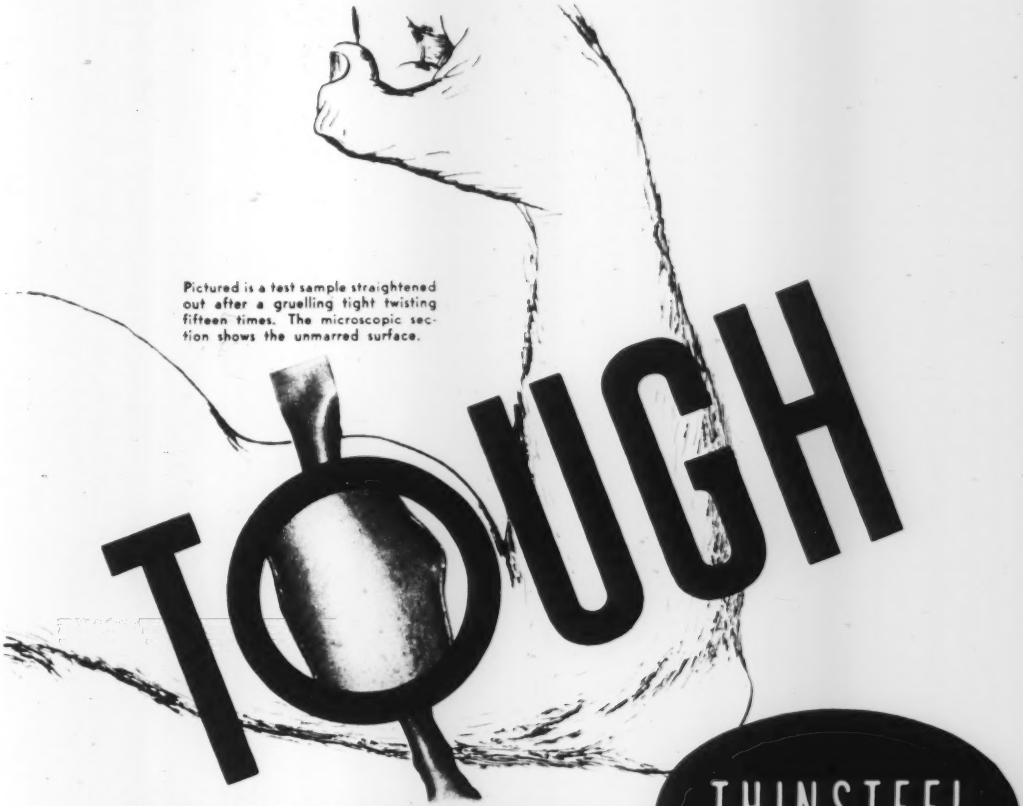
There are a number of mechanical or so-called ME departments. ME-1, for example, studies general problems of fatigue in machine parts, stress analysis, mechanical and heat treatment prestressing, gear analysis and general strength of material work. ME-2 concentrates on brakes, cold room testing under winter conditions and road testing. ME-4 works on advanced automotive engines, particularly high-horsepower, high-compression designs. ME-5 covers general engineering research projects on bearings, friction, lubrication, fatigue, hydraulics and diesel engines. ME-6 studies general factors involved in vibration, balancing, noise and wear. ME-7 deals with things like pistons, high-temperature alloys and gas turbines.

Build No Cars—An industrial hygiene department co-operates with GM medical men in the plants in protecting employees from possible sources of occupational illness—gases, dusts, fumes and mists. Finally, a plant engineering department examines maintenance, service, project facilities, working conditions, contracts and liaison with outside contractors, keeping abreast of municipal health, safety and equipment maintenance codes.

In the current gradual transfer of activities to the new Technical Center, an entirely new organizational detail is being worked out which will more clearly identify each department, supplanting cryptic designations (like ME-5) with specific names and assigning appropriate titles to the engineers in charge.

Overall program of Research Laboratories Division covers a long list of general laboratory projects, carefully chosen to represent the types of work which top management believes will be important to the future of the corporation. They are divided into main and sub-projects and their number is constantly increasing, particularly as the facilities are expanded and the staff enlarged. Any single department, or perhaps several departments, may be working on these projects simultaneously. Frequently the facilities and technical know-how of four or five departments may be consolidated on a single main project.

Success may be attained in relatively few projects, and sometimes there is no exact measure of what success may be. That is typical of most present-day research, as stated previously. If each project were to be a success then only those would be chosen which were certain of the goal before selection. Obviously that is research of a low order. Actually, finding out why something won't work may be considerably more important than it appears on the surface.



Pictured is a test sample straightened out after a gruelling tight twisting fifteen times. The microscopic section shows the unmarred surface.

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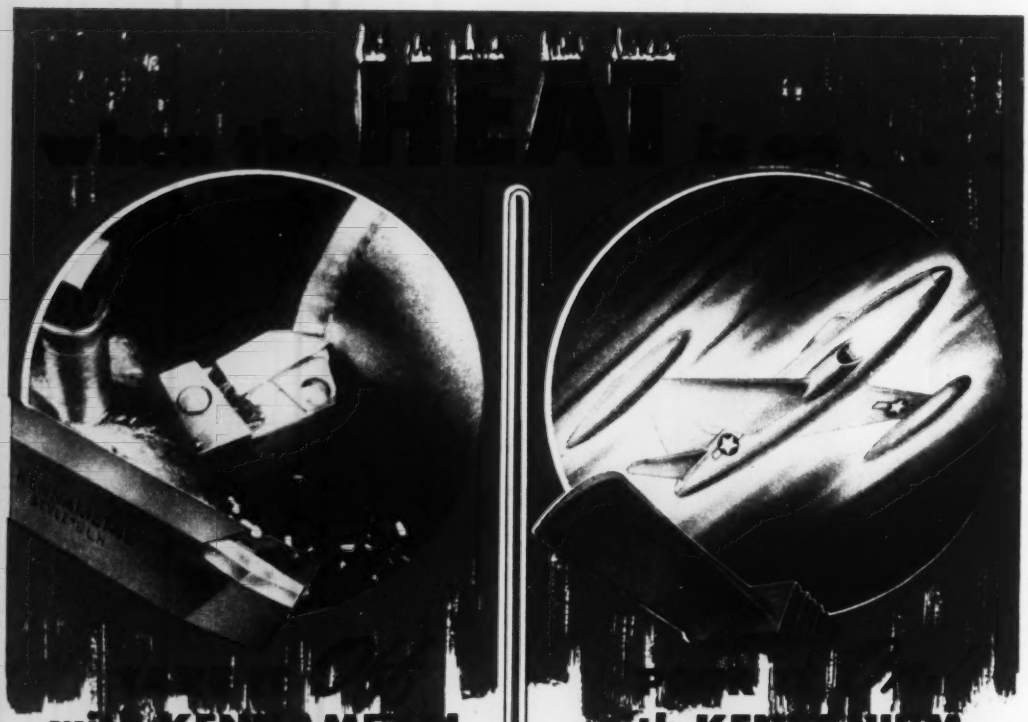

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American Society for Metals

PROGRAM

WORKING with new metals under the mechanical stresses and temperature extremes of the Jetomic Age will get close attention from metallurgists and production men attending the 34th annual National Metal Congress and Exposition in Philadelphia. The old stand-bys will not be overlooked as considerable energy is being expended toward understanding them better in view of the bigger job they have to do.

As usual the show can only be described as mammoth. More than 400 exhibits will occupy over 400,000 feet of floor space. Technical sessions will be held in four hotels and the city's Convention Hall. On this and succeeding pages are times and locations of all sessions. List of exhibitors begins on page 214.

1952-53 National officers of the participating technical societies are: American Society for Metals: President, Ralph L. Wilson, director of metallurgy, Steel & Tube Division, Timken Roller Bearing Co., Canton, O.; vice president, J. B. Austin, director of research laboratories, U. S. Steel Co., Kearney, N. J.; treasurer, Ralph L. Dowdell, head, Department of Metallurgy, University of Minnesota, Minneapolis; and secretary, W. H. Eisenman, ASM Headquarters, Cleveland.

American Welding Society: President, F. L. Plummer, Hammond Iron Works, Warren, Pa.; first vice president, E. R. Seabloom, supervisor engineering research labs, Crane Co., Chicago; secretary, J. G. MacGrath, AWS headquarters, New York.

American Institute of Mining & Metallurgical Engineers: President, Andrew Fletcher, St. Joseph Lead Co., New York; nominating committee recommendations for Institute of Metals Division: Chairman, Morris Cohen, Massachusetts Institute of Technology, Cambridge, Mass.; senior vice chairman, J. H. Scaff, Bell Telephone Laboratories; secretary and treasurer, Ernest O. Kirkendall, AIME Headquarters, New York.

Society for Non-Destructive Testing: President, Noah A. Kahn, chief metallurgist, Material Laboratory, New York Naval Shipyard, Brooklyn, N. Y.; secretary, Philip D. Johnson, national headquarters, Evanston, Ill.

American Society for Metals

Seminar on Modern Research Techniques in Physical Metallurgy

Sessions at Hotel Benjamin Franklin

Saturday, Oct. 18, 9:30 a.m.

Metallographic Methods

Optical Microscopy—George L. Kehl, Columbia University.

Electron Microscopy and Diffraction—Robert D. Heidenreich, Bell Telephone Laboratories.

Crystal Growth and Crystal Boundary Techniques—Bruce Chalmers, University of Toronto.

Saturday, Oct. 18, 2 p.m.

Diffraction Methods

X-Ray Diffraction Techniques—Charles S. Barrett, University of Chicago.

Diffuse Scattering of X-Rays—B. E. Warren and B. L. Averbach, Massachusetts Institute of Technology.

Pole Figure Determinations—A. H. Geisler, General Electric Co.

Techniques and Applications of Neutron Diffraction—C. G. Shull, Oak Ridge National Laboratory.

Saturday, Oct. 18, 8 p.m.

Demonstration Lecture

Electron Emission Studies of Metallurgical Problems—Erwin W. Muller, Pennsylvania State College.

Sunday, Oct. 19, 9:30 a.m.

Mechanical Methods

Deformation of Single Crystals—Earl R. Parker and Jack Washburn, University of California.

High-Speed Strain Measurements—George R. Irwin, Naval Research Laboratory.

Internal Friction—Professor Charles A. Wert, University of Illinois.

Sunday, Oct. 19, 2 p.m.

Ferromagnetic and Radioactive Methods

Ferromagnetic Domains—H. J. Williams, Bell Telephone Laboratories.

Radioactive Tracers—M. B. Bever, Massachusetts Institute of Technology.

Radioaction Damage as a Research Technique—Sidney Siegel, North American Aviation Inc.

Technical Papers

Monday, Oct. 20, 9:30 a.m.

Hotel Benjamin Franklin

Creep Rupture and Recrystallization

Creep-Rupture and Recrystallization of Monel from 700-1700° F—N. J. Grant, associate professor, and A. G. Bucklin, staff member, department of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.

Influence of Grain Size on High Temperature Properties

RALPH L. WILSON
President, American Society for Metals, 1952-53

J. B. AUSTIN
Vice-President, American Society for Metals, 1952-53

RALPH L. DOWDELL
Treasurer, American Society for Metals, 1952-53

DR. ROBERT F. MEHL
Recipient, ASM Gold Medal

CLEO F. CRAIG
Recipient, ASM Medal for Advancement of Research

DR. JOHN CHIPMAN
Recipient, ASM Albert Sauveur Achievement Award

of Monel—Paul Shahinian and J. R. Lane, members, metallurgical division, Naval Research Laboratory, Washington, D. C.

Creep and Rupture of Chromium-Nickel Austenitic Stainless Steels—E. J. Dulis, G. V. Smith and E. G. Houston, research laboratory, U. S. Steel Co., Kearny, N. J.

Recrystallization and Grain Growth in Alpha Brass—S. L. Channon, Kaiser Aluminum and Chemical Corp., Spokane, Wash., and H. L. Walker, head, department of mining and metallurgical engineering, University of Illinois, Urbana, Ill.

Monday, Oct. 20, 2 p.m.

Convention Hall

High Temperature Phases

Microconstituents in High Temperature Alloys—H. J. Beattie Jr., physicist, and F. L. VerSnyder, metallurgist, General Electric Co., Thomson Laboratory, W. Lynn, Mass.

Sigma Formation and Its Effect on the Impact Properties of Iron-Nickel-Chromium Alloys—A. M. Talbot and D. E. Furman, research laboratory, International Nickel Co. Inc., Bayonne, N. J.

Mechanism of the Carburization of Some Stainless Steels—J. E. Giacobbe, metallurgist, Superior Tube Co., Norristown, Pa.

Electrolytic Separation and Some Properties of Austenite and Sigma in 18-8-3-1 Chromium-Nickel-Molybdenum-Titanium Steel—T. P. Hoar, department of metallurgy, University of Cambridge, England, and K. W. J. Bowen, research department, Imperial Chemical Industries, Birmingham, England.

Tuesday, Oct. 21, 9:30 a.m.

Hotel Benjamin Franklin

Phase Transformation

Effect of Composition on the Temperature of Spontaneous Transformation of Austenite to Martensite in 18-8 Type Stainless Steel—G. H. Eichelman, metallurgist, American Brass Co., Waterbury, Conn., and F. C. Hull, manager, metallurgical section, Westinghouse Electric Corp., Pittsburgh.

Effect of Silicon on the Tempering of Martensite—A. G. Allten and P. Payson, assistant directors of research, Crucible Steel Co. of America, Harrison, N. J.

Mechanism and Kinetics of the First Stage of Tempering—C. S. Roberts, metallurgical laboratories, Dow Chemical Co., Midland, Mich., B. L. Averbach, assistant professor and M. Cohen, professor of physical metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.

Order Disorder Transformation Viewed as a Classical Phase Change—F. N. Rhines, professor of metallurgy, and J. B. Newkirk, Carnegie Institute of Technology, Pittsburgh.

Tuesday, Oct. 21, 2 p.m.

Convention Hall

Hardenability

An End-Quench Test for Determining Hardenability of Carburized Steels—F. X. Kayser, research metallurgist, and R. F. Thomson, head, metallurgy department, Research Laboratories Division, General Motors Corp., Detroit.

Influence of Boron on Case Hardenability in Alloy Carburizing Steels—C. F. Jatczak, research metallurgist and E. S. Rowland, chief metallurgical engineer, Timken Roller Bearing Co., Canton, O.

Effect of Carbon Content on 18-4-1 High Speed Steel—A. H. Grobe, research metallurgist, and G. A. Roberts, chief metallurgist, Vanadium-Alloys Steel Co., Latrobe, Pa.

Correlation of Machinability with Inclusion Characteristics in Resulphurized Bessemer Steels—L. H. VanVlack, process metallurgist, U. S. Steel Co., Pittsburgh.

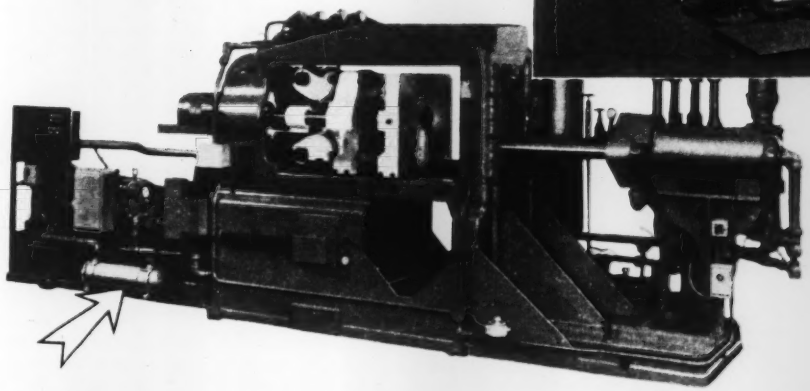
Wednesday, Oct. 22, 9:00 a.m.

Hotel Benjamin Franklin

ASM Annual Meeting

Edward DeMille Campbell Memorial Lecture
By Dr. Cyril Stanley Smith, Director,
Institute for the Study of Metals, Chicago

hydraulic oil always at prescribed temperature



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(2) Engineering design must more than meet the high speed demands of the machine,

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Wednesday, Oct. 22, 2 p.m.
Convention Hall

A Study of the Mechanism of the Delayed Yield Phenomenon—T. Vreeland Jr., D. S. Wood and D. S. Clark, department of mechanical engineering, California Institute of Technology, Pasadena, Calif.

Determination of Oxygen in Metals and Metal Oxides by the Isotopic Method—A. D. Kirshenbaum and A. V. Grosse, research institute, Temple University, Philadelphia.

Indium-Arsenic System—T. S. Liu, Horizons Inc., Cleveland, and E. A. Peretti, acting head, department of metallurgy, University of Notre Dame, S. Bend, Ind.

Thursday, Oct. 23, 9:30 a.m.
Convention Hall
Mechanical Properties

Effect of Quenching and Tempering on Residual Stresses in Manganese Oil-Hardening Tool Steel—H. J. Snyder, research associate, Mellon Institute of Industrial Research, Pittsburgh.

X-Ray Measurement of Residual Stress in Hardened High Carbon Steel—A. L. Christenson, research metallurgist, and E. S. Rowland, chief metallurgical engineer, Timken Roller Bearing Co., Canton, O.

Endurance Limit of Temper Brittle Steel—R. D. Chapman, research metallurgist, and W. E. Jominy, chief metallurgist, research, Chrysler Corp., Detroit.

Plastic Stress-Strain Relations of Alcoa 14S-T6 for Variable Biaxial Stress Ratios—Joseph Marin, professor of engineering mechanics, L. W. Hu and J. F. Hamburg, department of engineering mechanics, Pennsylvania State College, State College, Pa.

Thursday, Oct. 23, 2 p.m.
Convention Hall
Temper Brittleness

Effect of Various Heat Treating Cycles Upon Temper Brittleness—I. D. Jaffe and D. C. Buffum, Watertown Arsenal Laboratory, Watertown, Mass., and E. L. Carr, National Research Corp., Cambridge, Mass.

Effect of Hardness on the Level of the Impact Energy Curve for Temper Brittle and Unembrittled Steel—E. L. Carr, National Research Corp., Cambridge, Mass., M. Goldman, Battelle Memorial Institute, Columbus, O., I. D. Jaffe and D. C. Buffum, Watertown Arsenal Laboratory, Watertown, Mass.

Transverse Mechanical Properties in an SAE 1045 Forging Steel—A. H. Grobe, research metallurgist, Vanadium Alloys Steel Co., Latrobe, Pa., Cyril Wells, member of staff, and R. F. Mehl, director, metals research laboratory, Carnegie Institute of Technology, Pittsburgh.

Determination of the Elastic Constants of Metals by the Ultrasonic Pulse Technique—M. B. Reynolds, Knolls Atomic Power Laboratory, General Electric Co., Schenectady, N. Y.

Friday, Oct. 24, 9:30 a.m.
Convention Hall
Elevated Temperature Properties

Temperature Dependence of the Hardness of Pure Metals—J. W. Westbrook, Knolls Atomic Power Laboratory, General Electric Co., Schenectady, N. Y.

Hardness of Various Steels at Elevated Temperatures—F. Garofalo, P. R. Malenock and G. V. Smith, research laboratory, U. S. Steel Co., Kearny, N. J.

Some Properties of a Nodular Iron at Elevated Temperatures—M. S. Saunders, graduate student, and M. J. Sinnott, associate professor of chemical and metallurgical engineering, University of Michigan, Ann Arbor, Mich.

Accelerated Strain Aging of Commercial Sheet Steels—L. R. Shoenberger, research engineer and E. J. Palwoda, research engineer, Jones & Laughlin Steel Corp., Pittsburgh.

Lecture Courses

All Sessions at Ballroom, Convention Hall

Monday, Oct. 20, 4:30 p.m.
Behavior of Metals at Low Temperatures

Behavior of Single Crystals and Pure Metals—R. M. Brick, department of metallurgy, University of Pennsylvania, Philadelphia.

Monday, Oct. 20, 8 p.m.

Influence of Mechanical Variables—J. R. Low Jr., Knolls Atomic Power Laboratory, General Electric Co., Schenectady, N. Y.

Influence of Metallurgical Factors—C. H. Lorig, assistant director, Battelle Memorial Institute, Columbus, O.

Tuesday, Oct. 21, 4:30 p.m.
Gases in Metals

Fundamental Metallurgical and Thermodynamic Principles of Gas-Metal Behavior—D. P. Smith, professor emeritus, Princeton University, Princeton, N. J.

Gases in Nonferrous Metals and Alloys—L. W. Eastwood, assistant director of research, Kaiser Aluminum Co., Spokane, Wash.

Wednesday, Oct. 22, 4:30 p.m.

Behavior of Gases in Liquid Iron and Steel—D. J. Carney, chief development metallurgist, U. S. Steel Co., Chicago.

Behavior of Gases in Solid Iron and Steel—C. E. Sims, assistant director, Battelle Memorial Institute, Columbus, O.

Tuesday, Oct. 21, 8 p.m.
Metallurgical Tools for Alloy Conservation and Increased Production

All lectures by J. Alfred Berger, acting head, department of metallurgical engineering, University of Pittsburgh, Pittsburgh.

Significance of Chemical Analyses in Alloy Classification and Mechanical Properties.

Progress in Spectrography and X-Ray Diffraction Analyses and Techniques.

Wednesday, Oct. 22, 8 p.m.

Effects of Alloy Substitution on the Fundamentals of Hardening Metals.

Boron and Rare Earths in Alloy Conservation and Production.

American Welding Society
PROGRAM
All Sessions at Bellevue-Stratford Hotel

Monday, Oct. 20, 10 a.m.
Award of Prizes
Adams Lecture

Chairman—Charles H. Jennings, President, AWS
Co-chairman—H. R. Morrison, Chairman, Convention Committee

Welding and Brazing of Titanium Alloys—C. B. Voldrich, Battelle Memorial Institute.

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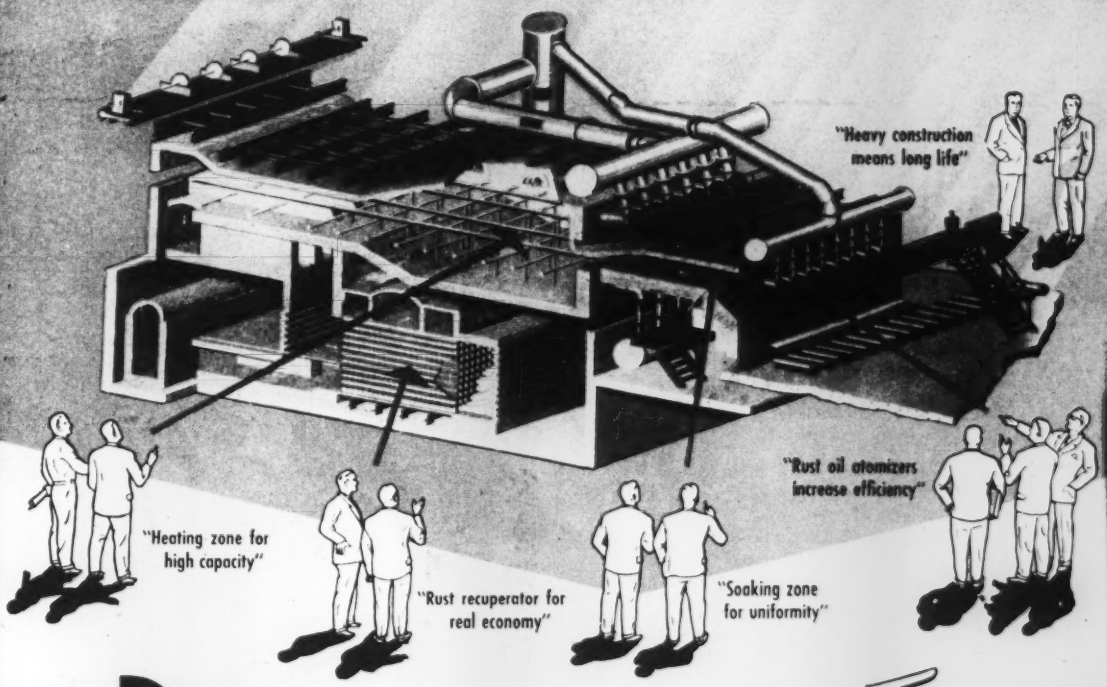
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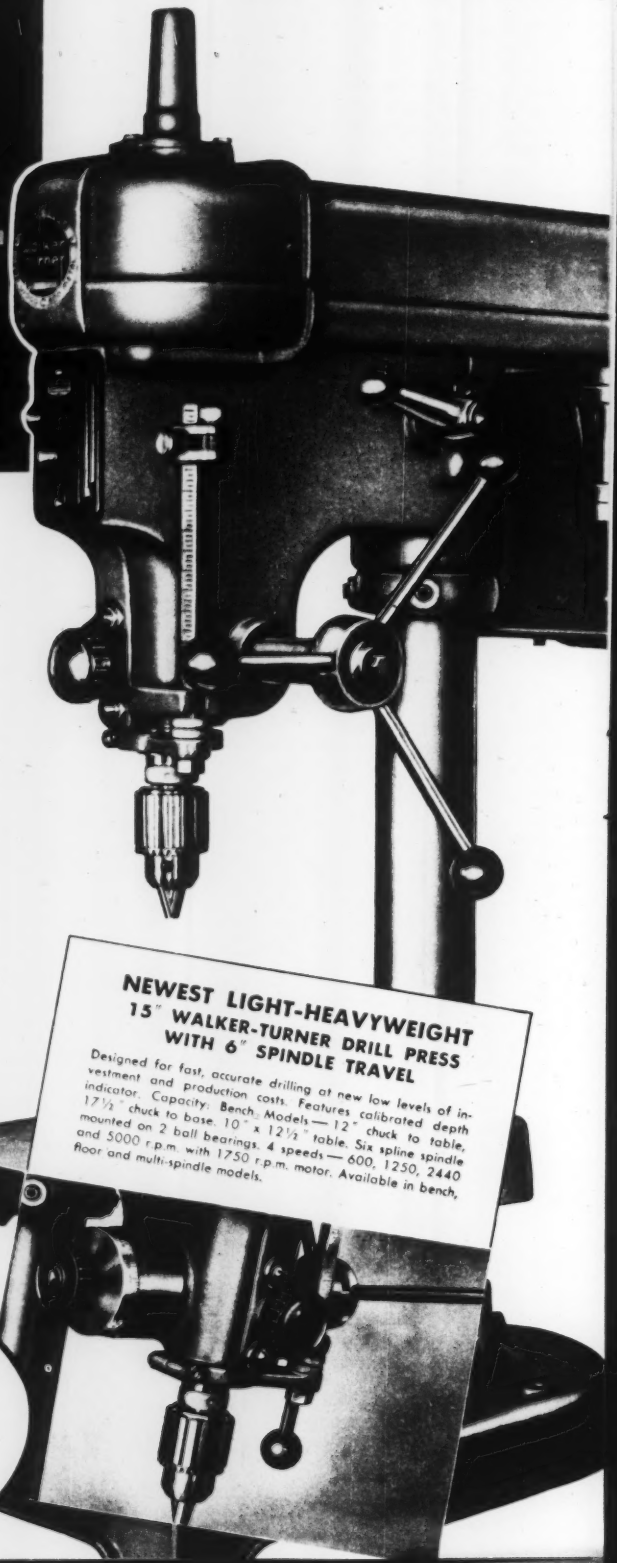

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AWS Program

Monday, Oct. 20, 2 p.m.
Three Simultaneous Sessions

I-Fabricating Procedures

Chairman—F. L. Plummer, Hammond Iron Works.

Co-chairman—H. C. Campbell, Arcos Corp.

Fusion Welding Techniques for Jet Aircraft Components—Arnold S. Rose and Morton A. Braun, I. T. E. Circuit Breaker Co.

Should Preheat Be Substituted for High Temperature Stress Relief in the Codes?—E. Paul DeGarmo, University of California.

Chromium-Recovery During Submerged-Arc Welding—James G. Kerr and David A. Elmer, C. F. Braun & Co.

II—Resistance Welding

Chairman—T. Embury Jones, Precision Welder & Machine Co.

Co-chairman—J. J. MacKinney, Budd Co.

Corrosion of Structural Spot Welds—B. Karnisky, E. P. Gruca and E. Kinelski, Pullman-Standard Car Mfg. Co.

Maintenance of Resistance Welders in High Speed Assembly Lines—James F. Salatin and O. D. Etchison, Delco-Remy Division, General Motors Corp.

III—Hard Facing, Flame Hardening

Chairman—E. H. Roper, Air Reduction Sales Co.

Co-chairman—R. A. Guenzel, Southern Oxygen Co.

Hard Facing Alloys of the Chromium Carbide Type—Howard S. Avery and Henry J. Chapin, American Brake Shoe Co.

Selection and Evaluation of Methods of Hard Facing—Jack J. Barry, Air Reduction Sales Co.

Flame Hardening of Large Diameter Thin Wall Cylindrical Shells—G. S. Wing and G. A. Weber, M. W. Kellogg Co.

Tuesday, Oct. 21, 9:30 a.m.
Three Simultaneous Sessions

I—Resistance Welding

Chairman—Jack Ogden, Fisher Body Division, General Motors Corp.

Co-chairman—K. W. Ostrom, K. W. Ostrom & Co.

Expressions of Spotweld Properties—Julius Heuschkel, Westinghouse Electric Corp.

Temperature Distribution During Flash Welding of Steel—Part II—Ernest F. Nippes, Warren F. Savage, John J. McCarthy and Sheridan S. Smith, Rensselaer Polytechnic Institute.

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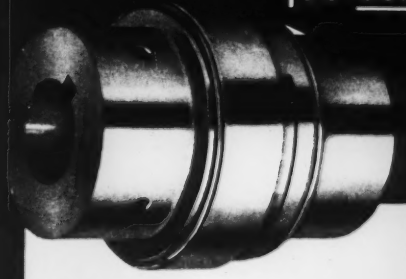

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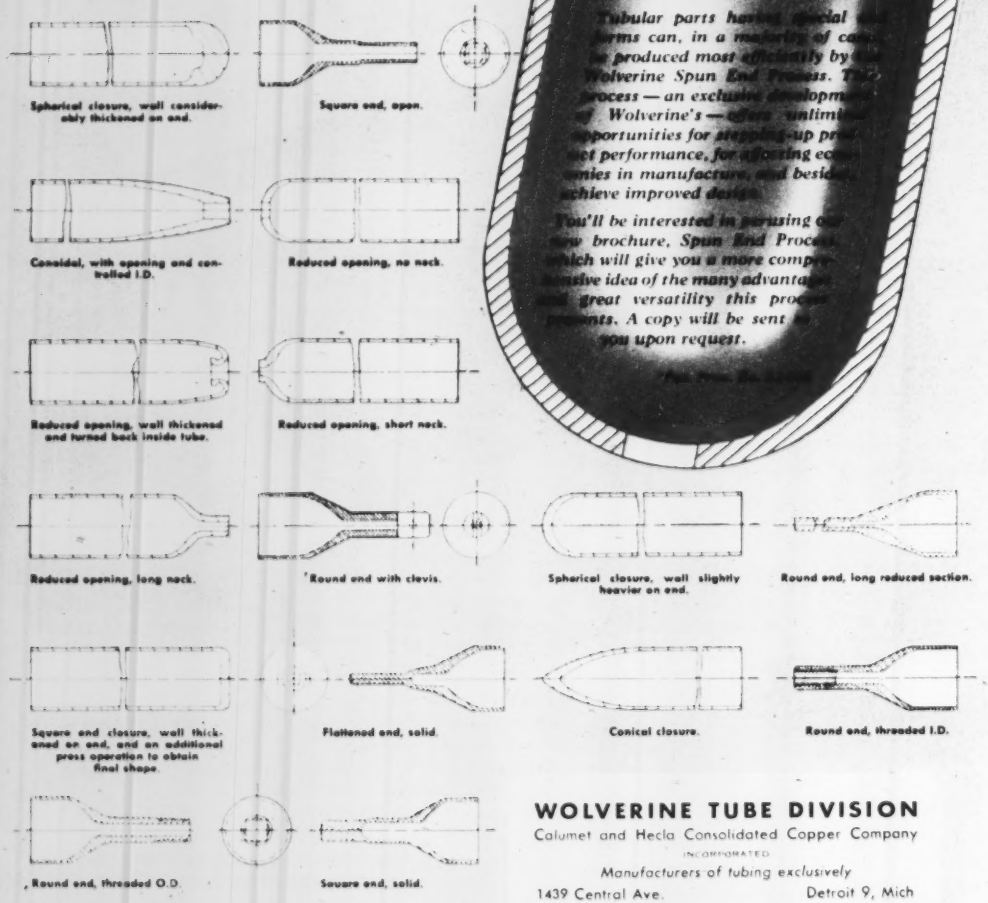
Spherical closure, wall considerably thickened on end.
Square end, open.
Conoidal, with opening and controlled I.D.
Reduced opening, no neck.
Reduced opening, wall thickened and turned back inside tube.
Reduced opening, short neck.
Reduced opening, long neck.
Round end with clevis.
Spherical closure, wall slightly heavier on end.
Round end, long reduced section.
Square end closure, wall thickened on end, and an additional press operation to obtain final shape.
Flattened end, solid.
Conical closure.
Round end, threaded I.D.
Round end, threaded O.D.
Square end, solid.

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AWS Program

Spot Welded Titanium-Base Alloy Sheet—M. L. Begeman and Frank W. McBee Jr., University of Texas.

Spot Welding Magnesium with Three Phase Low Frequency Equipment—Dean L. Knight and Paul Thorne, National Electric Welding Machines Co.; Paul Klein, Dow Chemical Co.

II—Weldability

Chairman—R. E. Somers, Bethlehem Steel Co.

Co-chairman—A. B. Gordon, Linde Air Products Co.

Further Studies of the Crack Sensitivity of Aircraft Steels—A. W. Steinberger and J. Stoop, Curtiss-Wright Corp.

Effect of Geometry on Stresses in Circular Patch Specimen—Alan V. Levy and Harry E. Kennedy, University of California.

Evaluation of the Circular Patch Weld Test—John E. Hackett and L. O. Seaborn, University of California.

Relationship of Welding Technique to Penetration and Dilution—Clarence E. Jackson and Arthur E. Shrubsall, Union Carbide & Carbon Corp.

III—Structural

Chairman—LaMotte Grover, Air Reduction Sales Co.

Co-chairman—I. E. Boberg, Chicago Bridge & Iron Co.

Behavior of Welded Portal Frames—E. R. Johnston and Lynn S. Beedle, Fritiz Engineering Laboratories, Lehigh University; J. M. Ruzek, C. F. Braun & Co.

Residual Stress and the Compressive Strength of Steel—Lynn S. Beedle and A. W. Huber, Fritiz Engineering Laboratories, Lehigh University; Bruce G. Johnston, University of Michigan.

How to Save Cost by Designing for Structural Welding—Alfred E. Pearson, Ingalls Iron Works Co.

Distortion Control in Structural Fabrication—Gordon Cape and Llewellyn Jehu, Dominion Bridge Co. Ltd.

Tuesday, Oct. 21, 2 p.m.
Three Simultaneous Sessions

I—Weldability

Chairman—E. M. MacCutcheon Jr., Bureau of Ships, Navy Department.

Co-chairman—L. J. Larson, Allis-Chalmers Mfg. Co.

Effect of Strain Rate on Twinning and Brittle Fracture in Low Carbon Steel—D. Rosenthal and C. C. Woolrey Jr., University of California.

Interpretation of Test Data Regarding Brittle Strength and Transition Temperature of Structural Steel—N. M. Newmark and W. C. Heltje, University of Illinois.

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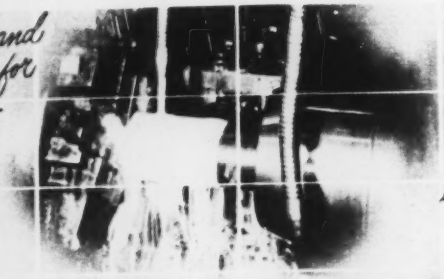
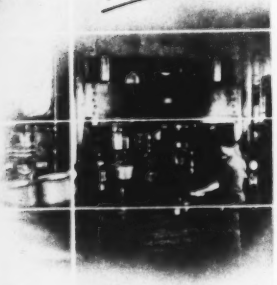
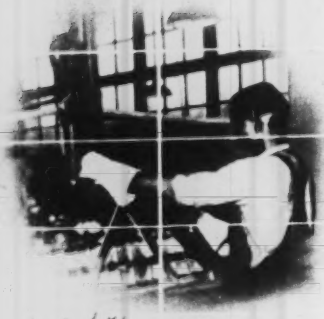


drawing lubricants for FORMING



compounds for metal CLEANING



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AWS Program

Factors Affecting the Structural Steel in Repeated Overloading—Robert D. Stout, John H. Gross and Dogan Gucer, Lehigh University.

II—Resistance Welding

Chairman — J. H. Cooper, Taylor Winfield Corp.

Co-chairman—W. G. Fetter, P. R. Mallory & Co.

Quality Control of Resistance Welding by Statistical Methods—J. F. Radford and R. K. Waldvogel, Crosley Division, Avco Mfg. Corp.

Contact Resistance as Affected by Subdividing the Contact Area—Wm. B. Kouwenhoven and Clarence W. Little Jr., Johns Hopkins University.

New Multispot Control Provides Increased Welding Production with Limited Power Supply—Claude R. Whitney Jr., Square D Co.

III—Brazing and Bronze Welding

Chairman—J. J. Vreeland, Chase Brass & Copper Co.

Co-chairman—L. H. Hawthorne, Revere Copper & Brass Inc.

New Aspects in Surface Alloying in Brazing and Related Techniques—Dr. Robert Humphrey and Rene D. Wasserman, Eutectic Welding Alloys Corp.

Strength Joints to Steel with Aluminum Bronze Filler Metals—Willis G. Groth, Ampco Metal Inc.

Tuesday, Oct. 21, 4:30 p.m.
Educational Lecture Series

Chairman—Gilbert E. Doan

Inert Gas Metal Arc Welding Processes—Walter H. Wooding, Philadelphia Naval Shipyard.

Wednesday, Oct. 22, 9:30 a.m.
Plant Visit
Two Simultaneous Sessions

I—Nonferrous

Chairman—O. B. J. Fraser, International Nickel Co.

Co-chairman—J. R. Hunter, Westinghouse Electric Corp.

Semiautomatic Inert-Gas Metal-Arc Welding of Aluminum Alloys—Charles T. Gayley, Joseph R. Girini and Walter H. Wooding, Industrial Test Laboratory, Philadelphia Naval Shipyard.

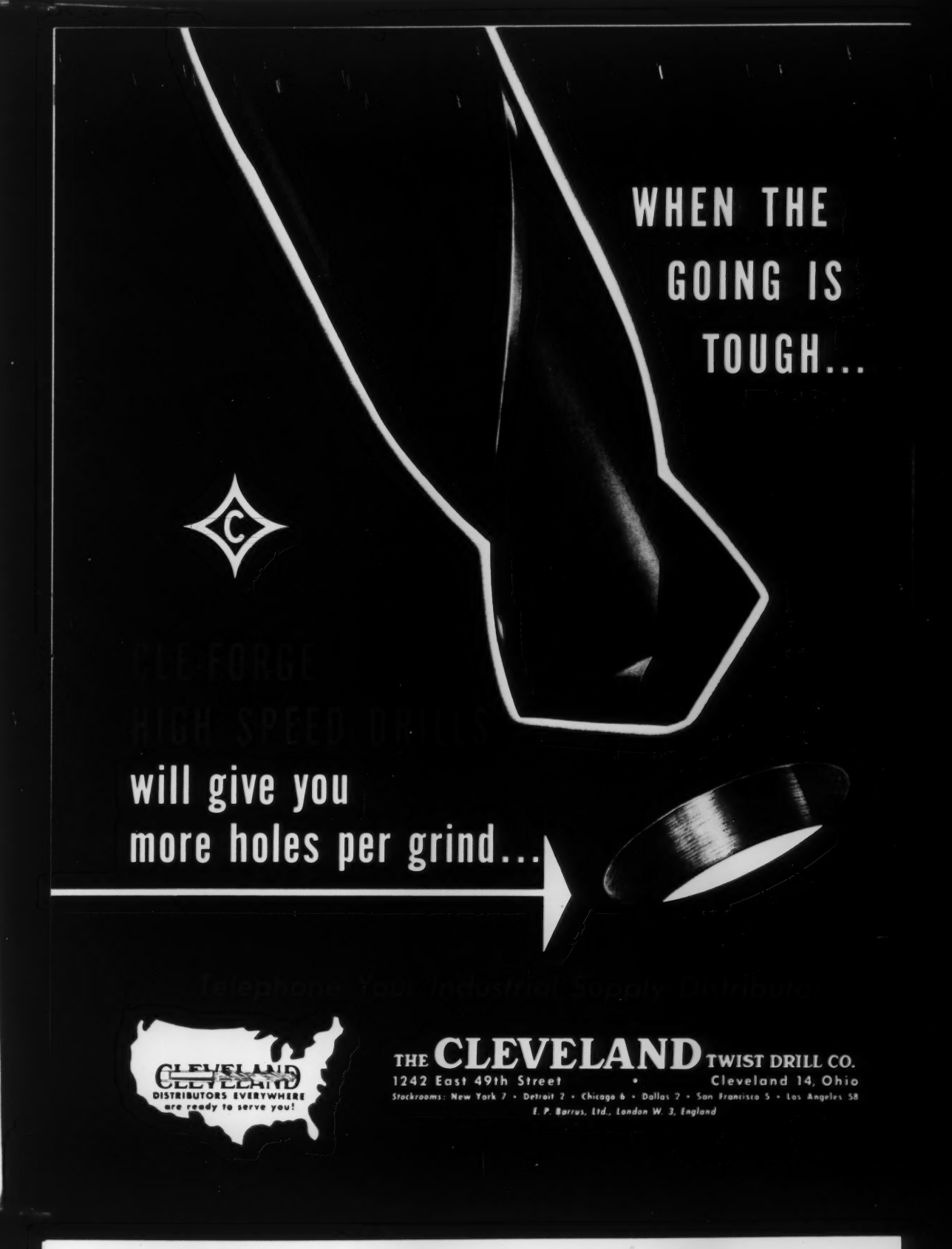
Welding 90-10 Cupro-Nickel by the Inert Gas Shielded Arc Processes—L. H. Hawthorne, Revere Copper and Brass Inc.

Weld Cracking of Aluminum Alloys—James D. Dowd, Aluminum Co. of America.

II—Weldability

Chairman—L. C. Bibber, U. S. Steel

Co-chairman—R. H. Lambert, Capt. USN.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Relation of Preheating to Low-Temperature Cooling Rate Embrittlement and Microcracking — A. E. Flanigan and T. Micleu, University of California.

Initiation and Propagation of Brittle Fractures in Structural Steels — Peter P. Puzak, Earl W. Eschbacher and William S. Pellini, Naval Research Laboratory.

Continuous Cooling Transformation of Weld Heat-Affected Zones—W. R. Apblett, L. K. Poole and W. S. Pellini, Naval Research Laboratory.

Determination of Optimum Welding Conditions for the Automatic Welding of High Hardenability Steels, With or Without Preheat—C. R. McKinsey and J. F. Collins, Union Carbide & Carbon Corp.

Wednesday, Oct. 22, 2 p.m.
Three Simultaneous Sessions

I—Weldability

Chairman—R. D. Thomas Jr., Arcos Corp.

Co-chairman—C. B. Jenni, General Steel Castings Corp.

Embrittlement of High Strength Ferritic Welds—Peter P. Puzak and William S. Pellini, Naval Research Laboratory.

Temper Brittleness in Low Alloy Weld Metal—Richard P. Wentworth and Hallock C. Campbell, Arcos Corp.

Effects of Electrodes and Welding Conditions on the Ductility of Arc Welded Mild Steels—Ernest F. Nippes and Alexander Lesnewich, Rensselaer Polytechnic Institute.

II—Nonferrous

Chairman—G. O. Hoglund, Aluminum Co. of America.

Co-chairman—J. S. Douglass, Linde Air Products Co.

Strength and Ductility of Welds in Aluminum Alloy Plate—F. M. Howell and F. G. Nelson Jr., Aluminum Research Laboratories.

Factors Which Determine the Performance of Aluminum Alloy Weldments—W. R. Apblett, C. R. Felmley and W. S. Pellini, Naval Research Laboratory.

Welding and Forming of Titanium—Francis H. Stevenson, Aerojet Engineering Corp.

III—Maintenance and Gas Cutting

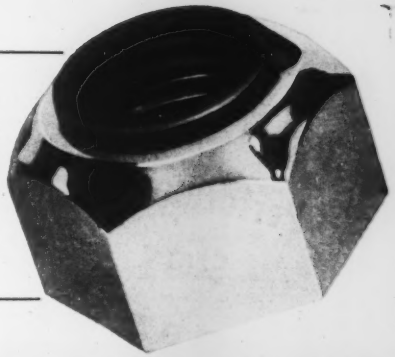
Chairman — H. V. Inskeep, Linde Air Products Co.

Co-chairman—A. M. Garcia, Morris, Wheel & Co. Inc.

Wear and Operation Problems in Maintenance—Frank J. Gaydos, Gary Works, U. S. Steel Co.

Effect of Oxygen Cutting on Alloy Steel—F. C. Saacke, Air Reduction Co. Inc.

★ *"It is believed that the Locknuts received a more severe test than they would have received under service conditions and that the stresses set up by the direct hammer test would have sheared a cotter pin."*



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The Statement Above!

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If you have been disappointed in the performance of ordinary locknuts and have a vibration problem we would like to show you the whole report from which the above statement was taken.

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Union Chain's Performance Story PART · I

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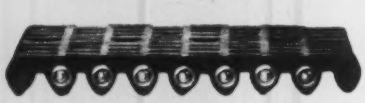
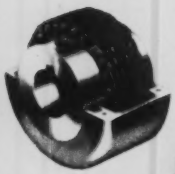
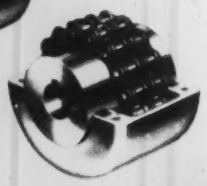


UNION SILENT CHAIN

UNION HEAVY DUTY CHAIN



UNION SILENT CHAIN FLEXIBLE COUPLING



UNION ROLLER CHAIN FLEXIBLE COUPLING

Part II - How UNION CHAIN *Manufactures*

With nothing to make but chains—with nothing to be known for but chains—Union Chain insists on meticulous accuracy in the execution of both conventional and *extra exclusively Union* manufacturing operations, thus insuring superiority of performance.

Part III - How UNION CHAIN *Recommends*

There is no need for Union Chain to recommend any chain but the right one — since Union Chain makes every type. Moreover, wide experience with every type of chain makes a recommendation from Union Chain's engineering staff a valuable one.

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* At the present time there is a heavy demand for many types of chain. Consequently, our distributors are not always in a position to fill all orders from stock.

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Cleveland 13, Ohio

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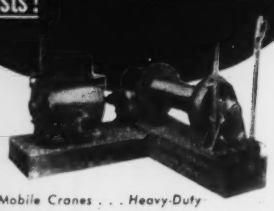

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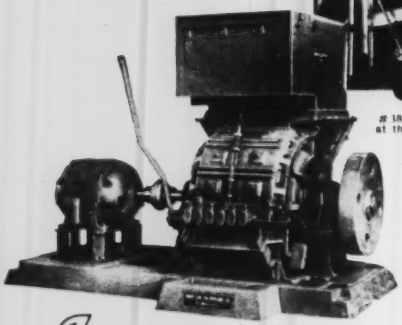

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AWS Program

Wednesday, Oct. 22, 4:30 p.m.

Educational Lecture Series

Chairman—Gilbert E. Doan.

Inert Gas Metal Arc Welding Processes—Walter H. Wooding, Philadelphia Naval Shipyard.

Thursday, Oct. 23, 9:30 a.m.

Three Simultaneous Sessions

I—Inert Arc Welding

Chairman—C. I. MacGuffie, General Electric Co.

Co-chairman—K. L. Walker, Foster Wheeler Corp.

A Comparison of Shielding Mixtures for Gas Shielded Arc Welding—John W. Cunningham, Air Reduction Sales Co.

Production Welding of Mild and Low Alloy Steels by Gas Shielded Arc Welding—John H. Berryman, Air Reduction Sales Co.

Porosity in Mild Steel Weld Metal—Donald Warren, E. I. duPont de Nemours & Co.; R. D. Stout, Lehigh University.

II—Brazing

Chairman—A. N. Kugler, Air Reduction Sales Co.

Co-chairman—A. M. Setapen, Handy & Harmon.

Advanced Information for the Brazing Operator—E. F. Davis, Westinghouse Electric Corp.

Joint Design for Brazing—W. J. Van Natten, General Electric Co.

Technical Aspects of Soldering Practices—R. M. MacIntosh, Tin Research Institute Inc.

Production Brazing—J. R. Wirt, Delco-Remy Division, General Motors Corp.

III—Marine Construction

Chairman—David P. Brown, American Bureau of Shipping.

New Rules for Welding Low Alloy Ferritic Pipe Material — Cdr. Charles F. Perry, USCG.

Evaluation of Brittle Failure Research—Paul Ffield and Ed Sweeney, Bethlehem Steel Co.

An Investigation on Peening—G. W. Place, American Bureau of Shipping.

Friday, Oct. 24, 9:30 a.m.

Three Simultaneous Sessions

I—Pipe

Chairman—E. R. Seabloom, Crane Co.

Co-chairman—A. J. Erlacher, United Engineers & Constructors.

Pipe Welding in the Petroleum Refining Industry—Albert W. Zeuthen, Socony Vacuum Oil Co.

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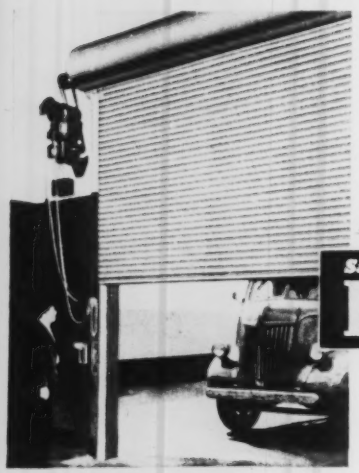

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AWS Program

Arc Welding of Low Chromium Molybdenum Steel Pipe—J. Bland, L. J. Privoznik and F. J. Winsor, Standard Oil Co. of Indiana.

Effect of Stresses and Stress Relief on the Bursting Strength of Circumferentially Welded Pipe—L. J. Privoznik and F. J. Winsor, Standard Oil Co. of Indiana.

II—Inert Arc

Chairman—C. D. Evans, International Harvester Co.

Co-chairman—N. E. Wheeler, Truck & Coach Division, General Motors Corp.

Inert Gas Shielding of the Metallic Arc—William L. Green and Robert J. Krieger, Ohio State University.

Gas Flow Requirements for Inert Gas Arc Shielding—Glenn J. Gibson, Air Reduction Co. Inc.

Shielded Arc Welding of Jet Engine Components — K. H. Koopman, Linde Air Products Co.

III—Marine Construction

Chairman—H. W. Pierce, New York Shipbuilding Corp.

Co-chairman—J. Lyell Wilson, Consulting Naval Architect.

Observations on Experience with Welded Ships—David P. Brown, American Bureau of Shipping.

Prevention of Marine Corrosion by Metallizing Systems — Howard Vanderpool, Metallizing Engineering Co.

Failure and Defects Encountered in Welded Ship Construction—Ralph D. Bradway, New York Shipbuilding Corp.

Institute of Metals Division, AIME

PROGRAM

Sessions at Hotel Adelphia

Monday, Oct. 20, 9 a.m.

Crystal Room

Thermodynamic and Thermal Properties

J. P. Nielsen, Chairman; D. J. Blickwede, Secretary

Scaling of Lead in Air—Elmer Weber, Chase Brass & Copper Co.; W. M. Baldwin Jr., Case Institute of Technology.

Concentration Dependence of Diffusion Coefficient in Metallic Solid Solutions—D. E. Thomas, Westinghouse Atomic Power Divisions; C. E. Birchenall, Carnegie Institute of Technology.

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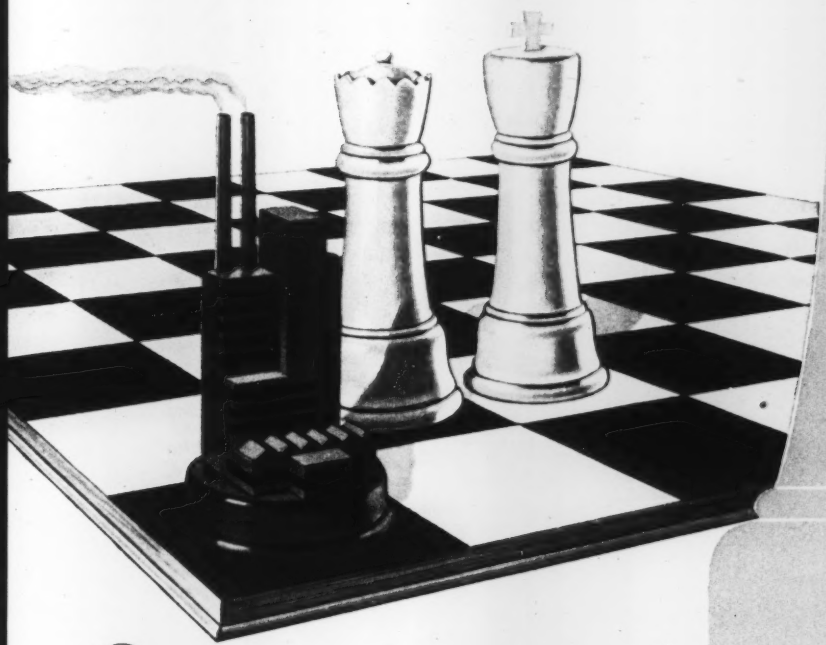

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10 ***Handle Increasing Load*** . . . in-plant power economically adds to current capacity as loads increase.

11 ***Fuel Economy*** . . . use diesel oil, natural gas or sewage gas for added economy.

12 ***Remote Locations*** . . . distance from transmission lines needn't curtail plant expansion.

13 ***More Compact Power*** . . . Fairbanks-Morse engines give you more power per foot of floor space, more power on present foundation.

14 ***Minimum Attendance*** . . . Fairbanks-Morse in-plant generating sets require far less supervision or maintenance.

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FILE 513

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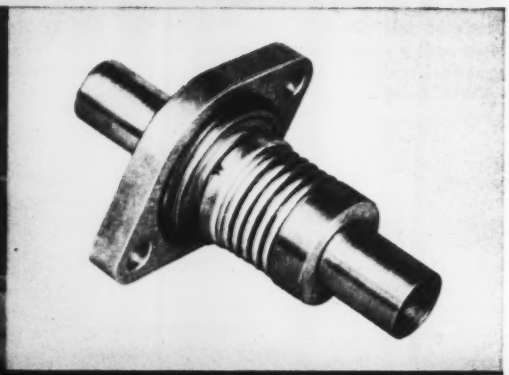

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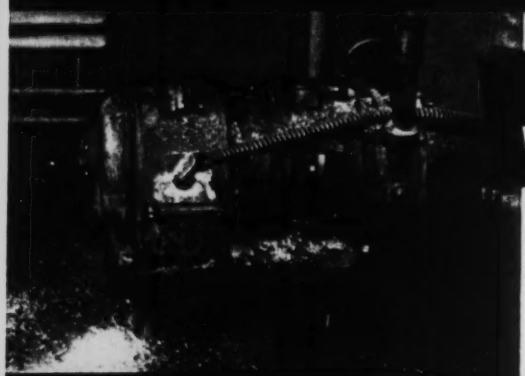

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OFFICES IN PRINCIPAL CITIES

Thermodynamic Properties of Solid Nickel-Gold Alloys—L. L. Seigle, Sylvania Electric Products Inc.; M. Cohen and B. L. Averbach, Massachusetts Institute of Technology.

Transformation in Cobalt-Nickel Alloys—J. B. Hess, Kaiser Aluminum & Chemical Corp.; C. S. Barrett, University of Chicago.

Principles of Zone-Melting — W. G. Pfann, Bell Telephone Laboratories.

Segregation of Two Solutes, with Particular Reference to Semiconductors—W. G. Pfann.

Monday, Oct. 20, 9 a.m.
Jefferson Room

High Temperature

L. A. Carapella, Chairman; F. P. Bens, Secretary

Some Observations of Sub Grain Formation During Creep in High Purity Aluminum—I. S. Servi, Union Carbide & Carbon Corp.; J. T. Norton and N. J. Grant, Massachusetts Institute of Technology.

Observations of Creep of the Grain Boundary in High Purity Aluminum—H. C. Chang and N. J. Grant, Massachusetts Institute of Technology.

Creep Correlations in Alpha Solid Solutions of Aluminum—O. D. Sherby and J. E. Dorn, University of California.

Effect of Zirconium on Magnesium-Thorium and Magnesium-Thorium-Cerium Alloys—T. E. Leontis, Dow Chemical Co.

Influence of Chemical Composition on the Rupture Properties at 1200° F of Wrought Cr-Ni-Co-Fe-Mo-W-Cb Alloys—E. E. Reynolds, Allegheny-Ludlum Steel Corp.; J. W. Freeman and A. E. White, University of Michigan.

High Temperature Oxidation of Some Iron Chromium Alloys—D. Caplan and M. Cohen, National Research Council, Ottawa.

Mechanical Properties of Intermetallic Compounds at Elevated Temperatures — Robert Lowrie, Lewis Flight Propulsion Laboratory.

Tuesday, Oct. 21, 9 a.m.
Crystal Room

Symposium on Titanium and Titanium Alloys
M. A. Hunter, *Chairman*

Tuesday, Oct. 21, 9 a.m.
Jefferson Room

Deformation

T. E. Leontis, Chairman; H. Y. Hunsicker, Secretary

Dynamic Formation of Slip Bands in Aluminum—N. K. Chen and R. B. Pond, Johns Hopkins University.

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AIME Program

Observations on the Tension Texture of Aluminum—E. A. Calnan and Betty E. Williams, National Physical Laboratory.

Deformation of Zinc Bicrystals by Thermal Ratcheting—J. E. Burke and Anna M. Turkalo, General Electric Co.

Surface Effects in the Slip and Twinning of Metal Monocrystals—J. J. Gilman, and T. A. Read, Columbia University.

Bend Plane Phenomena in the Deformation of Zinc Monocrystals—J. J. Gilman, General Electric Co.; T. A. Read, Columbia University.

Kinking in Zinc Single Crystal Tension Specimens—Jack Washburn and E. R. Parker, University of California.

Tuesday, Oct. 21, 2 p.m.

Crystal Room

Symposium on Titanium and Titanium Alloys (Cont'd.)

Jefferson Room

Physical Metallurgy

T. A. Read, Chairman; R. L. Fullman, Secretary

Development of Mechanical and Magnetic Hardness in a 10 per cent Vanadium-Cobalt-Iron Alloy — R. W. Fountain, Union Carbide & Carbon Corp.; J. F. Libsch, Lehigh University.

Observations on Nodular Graphite—H. M. Weld, R. L. Cunningham and F. W. C. Boswell, Department of Mines and Technical Surveys.

Recrystallization Kinetics of Low Carbon Steel—S. F. Reiter, General Electric Co.

Effect of Molybdenum and Nickel on the Rate of Nucleation and the Rate of Growth of Pearlite—R. W. Parcel, Rem-Cru Titanium Inc.; R. F. Mehl, Carnegie Institute of Technology.

Effect of Applied Stress on the Martensitic Transformation—S. A. Kulin, Westinghouse Atomic Power Division; M. Cohen and B. L. Averbach, Massachusetts Institute of Technology.

A Study of Grain Shape in an Aluminum Alloy and Other Applications of Stereoscopic- Microradiography—W. M. Williams, Revere Copper and Brass Co.; C. S. Smith, University of Chicago.

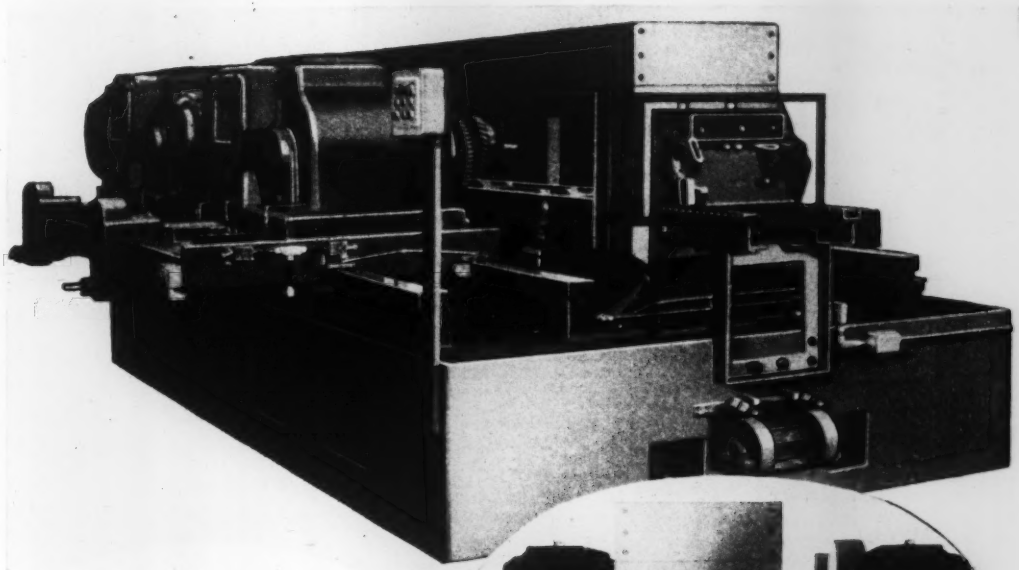
Wednesday, Oct. 22, 2 p.m.

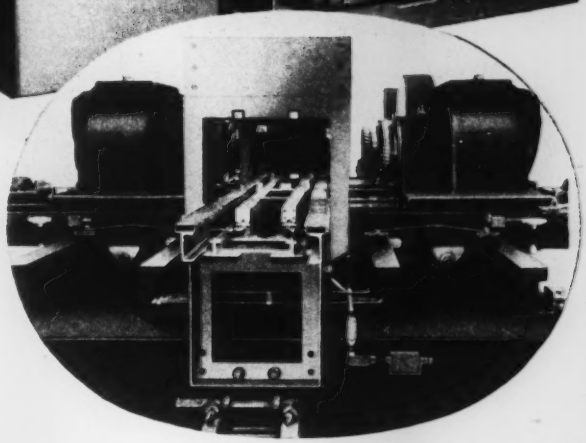
Crystal Room

Titanium

J. E. Burke, Chairman; E. S. Greiner, Secretary

Titanium-Chromium Phase Diagram —F. B. Cuff, N. J. Grant and C. F. Floe, Massachusetts Institute of Technology.





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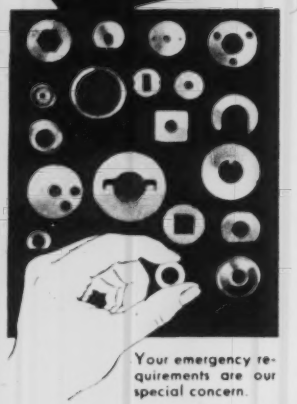

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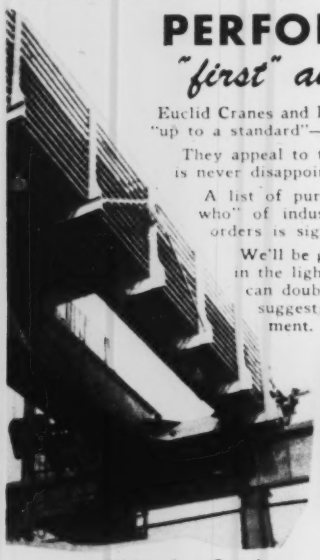

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AIME Program

Titanium-Copper Binary Phase Diagram—A. Joukainen, E. I. du Pont de Nemours & Co. Inc.; N. J. Grant and C. F. Floe, Massachusetts Institute of Technology.

Titanium-Aluminum System—E. S. Bumps, H. D. Kessler and M. Hansen, Armour Research Foundation, Illinois Institute of Technology.

Observations on the Lattice Parameters of the Alpha and TiO Phases in the Titanium-Oxygen System—W. Rostoker, Armour Research Foundation, Illinois Institute of Technology.

Nature of the Line Markings in Titanium and Alpha Titanium Alloys—C. M. Craighead, G. A. Lenning and R. I. Jaffee, Battelle Memorial Institute.

Time - Temperature - Transformation Characteristics of Titanium-Molybdenum Alloys—D. J. DeLazaro, M. Hansen, R. E. Riley and W. Rostoker, Armour Research Foundation, Illinois Institute of Technology.

Compression Texture of Iodide Titanium—D. N. Williams and D. S. Eppelsheimer, Missouri School of Mines and Metallurgy.

Partial Titanium-Vanadium Phase Diagram—Paul Pietrokowsky and Pol Duwez, California Institute of Technology.

Wednesday, Oct. 22, 2 p.m.

Jefferson Room
Constitutional Diagrams

B. H. Alexander, Chairman; E. J. Dofter, Secretary

Tungsten-Cobalt-Carbon System—Pekka Rautala and J. T. Norton, Massachusetts Institute of Technology.

Role of the Binder Phase in Cemented Tungsten Carbide-Cobalt Alloys—Joseph Garland, Firth Sterling Inc.; J. T. Norton, Massachusetts Institute of Technology.

Solubility of Carbon and Oxygen in Molybdenum—W. E. Few and G. K. Manning, Battelle Memorial Institute.

System Molybdenum Boron and Some Properties of the Molybdenum Borides—Robert Steinitz, Ira Binder and David Moskowitz, American Electro Metal Corp.

Systems Zirconium-Molybdenum and Zirconium-Wolfram—R. F. Domagala, D. J. McPherson and M. Hansen, Armour Research Foundation, Illinois Institute of Technology.

Copper-Zinc Constitution Diagram Redetermined in the Vicinity of the Beta Phase by Means of Quantitative Metallography—Lilian Beck and C. S. Smith, University of Chicago.

Intermediate Phases in the Mo-Fe-Co, Mo-Fe-Ni and Mo-Ni-Co Ternary Systems—D. K. Das, Notre Dame University; S. P. Rideout, E. I. du Pont de Nemours Argonne National Laboratory; P. A. Beck, University of Illinois.

R-271

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SIVYER STEEL CASTING COMPANY • MILWAUKEE Ⓢ CHICAGO Ⓢ MAIN OFFICE: 1675 SO. 43rd ST. • MILWAUKEE, WIS.

Society for Non-Destructive Testing

PROGRAM

All Sessions at Hotel Sylvania

Monday, Oct. 20, 9 a.m.

10 a.m. President's Address

Lowering Production Costs with Modern X-Ray Equipment

General Electric Industrial Betatron —T. W. Dietze, General Engineering Laboratory, General Electric Co.

Modern Techniques in Precision High-Voltage Radiography—E. Alfred Burrill, High-Voltage Engineering Corp.

Uses of Low-Voltage X-Ray Tubes With Thin Beryllium Windows in Nondestructive Testing—Tom H. Rogers, Machlett Laboratories.

Current Status of the Picker-Polaroid Process for One-Minute Radiography in the Industrial Field—W. B. Pyle, Picker X-Ray Corp.

Alternate: Direct Exposure Enlargement Techniques in Radiography and Fluoroscopy Utilizing Fractional-Focus X-Ray Tubes—Leo C. Kotraschek, North American Phillips Co. Inc.

Monday, Oct. 20, 2 p.m.

New Techniques for Applying X-Ray Nondestructive Tests

Reduction of Exposure Time in Gamma Radiography—J. J. Hirschfield and D. T. O'Connor, Naval Ordnance Laboratory.

Techniques Used in Measuring Uniformity of Materials by Means of Gamma Radiation—Lawrence R. Megill and John N. Harris, Los Alamos.

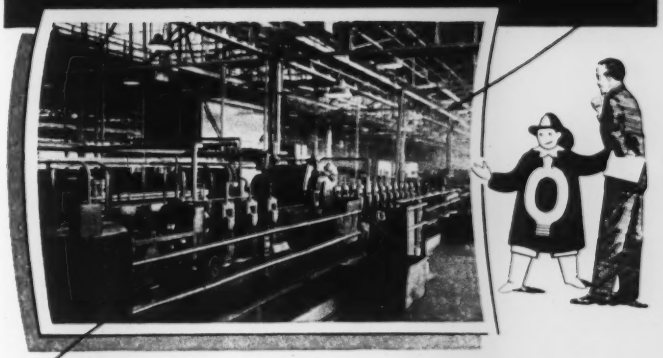
Some Industrial Applications of Micro-Radiography—S. Goldspiel and F. Bernstein, New York Naval Shipyard.

Gaging Tin Coatings in the Steel Industry by X-Ray Fluorescence Analysis—C. J. Woods, North American Phillips Co. Inc.

Alternate: Application of Fluorescence X-Rays to Metallurgical Microradiography—Herman E. Seeman and H. R. Splettstosser, Eastman Kodak Co.

Alternate: Radiography With Iridium 192—James V. Rigbey, Ford Motor Co. of Canada.

Today's high replacement costs
emphasize the need for



"Automatic" Sprinkler
10-point FIRE PROTECTION

Take a look at your production equipment. Some machines have probably had their original cost written off by many years of service. Others may be only a few years old and still others practically new. Yet *all* of them are vital to your operation.

Have you ever considered how much it would cost to replace them with all new equipment at *today's high prices?*

Of course they're insured. And if your company is alert, you try to keep insurance coverage up to value. But are you informed daily of every price rise on every piece of equipment you own? Have you figured installation costs at today's high labor rates? Are you sure that replacement equipment is obtainable on short notice *at any price?*

The more you think about it, the more you'll agree that it's far better to prevent the destruction of vital equipment than to face the prospect of replacing it at many times its original cost. "*Automatic*" *Sprinkler 10-Point Fire Protection* is designed, engineered and manufactured specifically for you to do just that!

Write today for our factual book
"The ABC of Fire Protection"

"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA
YOUNGSTOWN 1, OHIO
OFFICES IN PRINCIPAL CITIES OF NORTH AND SOUTH AMERICA

"Automatic" Sprinkler
FIRST IN FIRE PROTECTION

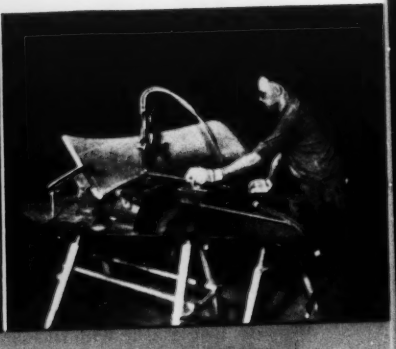
When The Heat's On...

Every Facility for Producing Armor Plate

Ready to Assemble In Gauges from 1/4" to 4" Inclusive

Quenching operation in 2,500 ton press

Checking flatness in straightening press



Torch cutting on radial machine

ARMOR PLATE *for Ordnance*

We can save you time and money!

Our group of fully integrated subcontracting plants is equipped, staffed and prepared to furnish the armor plate you need, when and where you need it.

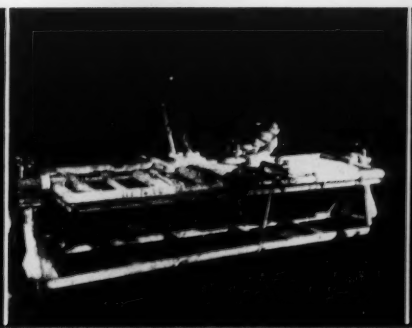
We can serve your every requirement—whether it be for large or small parts in flat, blanked or formed shapes, fully machined or even subassembled. We have the experience, the facilities and the flow of work to handle critical-specification production to your over-all advantage.

We will engineer the parts for the utmost economy, design the tooling, procure the material, inspect production all along the line and expedite delivery to meet your schedules. Best of all we are ready *now* to serve you. Write, wire or phone us today.

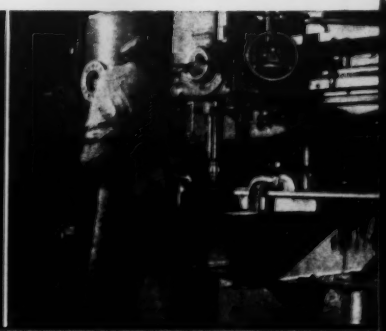
Standard Steel Spring Company

ARMOR PLATE DIVISION • PENOBSCOT BLDG. • DETROIT, MICHIGAN

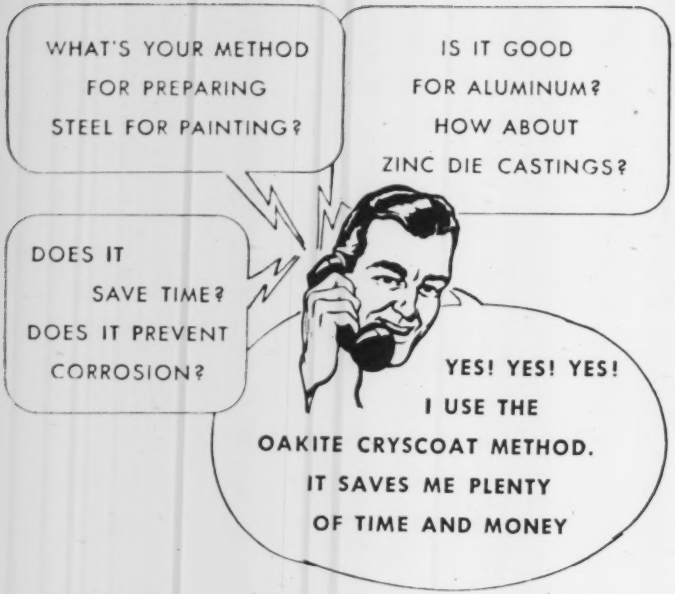
Edge preparation of armor plate



Welded fabrication of subassemblies



Machining to customers' specifications


WHAT'S YOUR METHOD FOR PREPARING STEEL FOR PAINTING?
IS IT GOOD FOR ALUMINUM? HOW ABOUT ZINC DIE CASTINGS?
DOES IT SAVE TIME? DOES IT PREVENT CORROSION?
YES! YES! YES! I USE THE OAKITE CRYSCOAT METHOD. IT SAVES ME PLENTY OF TIME AND MONEY

The OAKITE CrysCoat* PROCESS does three things at one time:

1 Cleans metal rapidly—removing cutting, drawing, stamping oils and compounds, rust preventives, fluxes, smuts and other soils.

2 Conditions metal for painting—preparing steel, aluminum, zinc die castings and other metals for lasting adhesion of paints, lacquers and enamels.

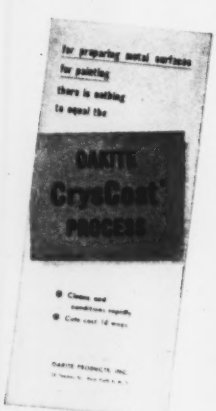
3 Increases resistance to corrosion—preventing it before painting; localizing it after painting.

Eliminating the need for separate cleaning and phosphating operations, the OAKITE CrysCoat PROCESS cuts costs these ways:

- Uses less equipment
- Cuts operating time
- Reduces heating costs
- Saves cost of acid-proof equipment
- Reduces scaling and sludging
- Saves paint
- Reduces rejects

FREE Write to Oakite Products, Inc., 34E Rector St., New York 6, N. Y., for a copy of *"The OAKITE CrysCoat PROCESS"* describing 19 advantages.

*Reg. U. S. Pat. Off.



SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS · METHODS · SERVICE

Technical Service Representatives Located in Principal Cities of United States and Canada

SNT Program

Tuesday, Oct. 21, 9 a.m.

Control and Interpretation in X-Ray Nondestructive Testing

Film Characteristics as Applied to Radiation Monitoring—George Corney, Eastman Kodak Co.

Problems of Mechanical Film Development—Donald F. Hauptman and Gerold H. Tenney, Los Alamos.

Various Penetrameter Types and Their Limitations—Norman C. Miller and Gerold H. Tenney, Los Alamos.

Interpretation of Radiographs of Aluminum and Magnesium Castings—J. J. Pierce, Naval Ordnance Laboratory.

Interpretation of Fluoroscopic Images of Aluminum and Magnesium Castings—D. T. O'Connor and D. Polasky, Naval Ordnance Laboratory.

Alternate: Semi-Empirical Equation for the Spectral Energy Distribution in X-Ray Beams—Charles R Emigh, Los Alamos.

Tuesday, Oct. 21, 2 p.m.

Economics of Nondestructive Testing to Lower Production Costs

Economic Factors in Nondestructive Testing—W. E. Thomas, vice-president, Magnaflux Corp.

Quality Control Application of Nondestructive Tests in the Airframe Industries Which Will Effectively Lower Production Costs—B. W. Clawson, quality manager, Douglas Aircraft Inc.

Use of Nondestructive Tests Methods in Heavy Manufacture—James A. Pratt, metallurgical engineer, Westinghouse Electric Corp.

Alternate: Economics of Nondestructive Testing in European Industry—Speaker to be announced.

Tuesday Evening, Oct. 21, 5 p.m. and 9 p.m.

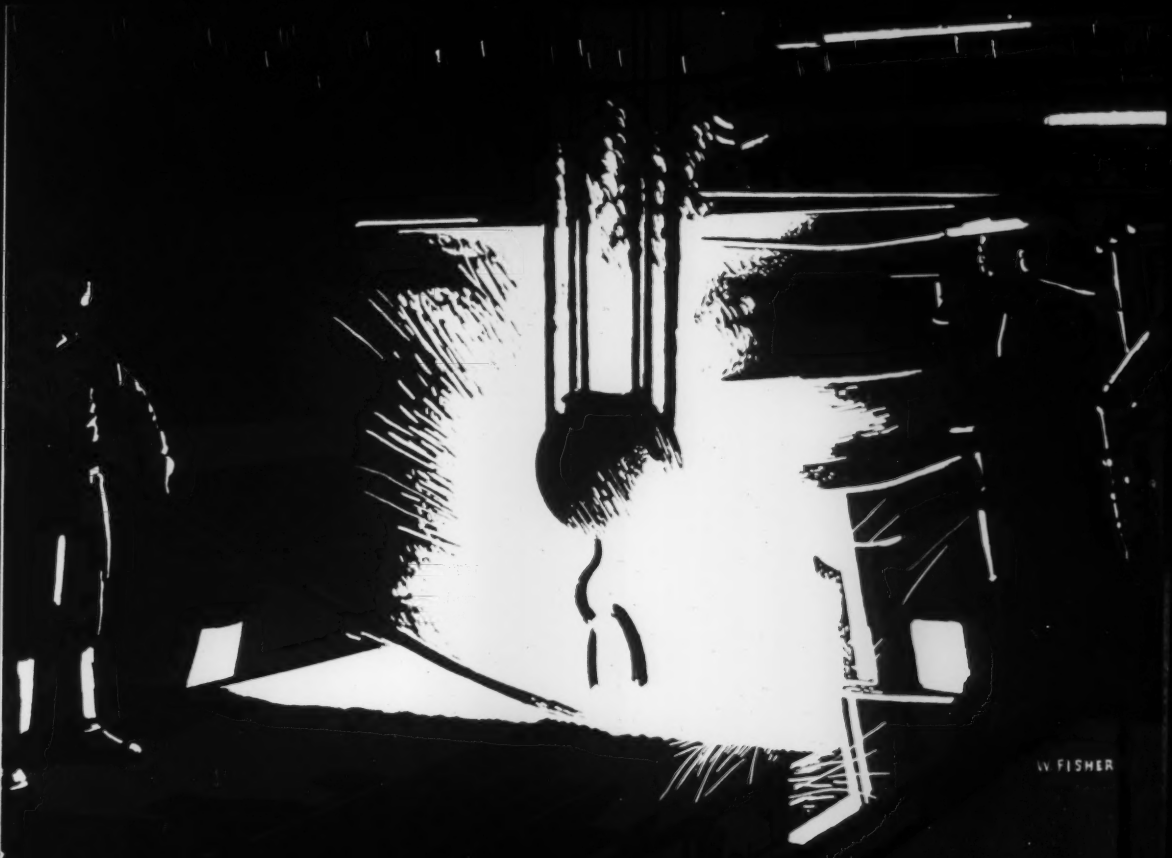
Annual Officers' Reception and Social Meeting

Wednesday, Oct. 22, 2 p.m.

New Methods and Applications of Ultrasonic Nondestructive Tests to Lower Industrial Production Costs

An Evaluation of New Immersion Ultrasonic Testing Techniques—Leslie W. Ball, U. S. Naval Ordnance Test Station.

Ultrasonic Examinations of Weldments and the Establishment of Safe Acceptable Limits for Defects—Frank C. Parker, Carbide & Carbon Chemicals Co.



WHENEVER you need
SPECIAL STEELS
for special purposes
check with

• *carbon electric steel for tank clutch discs* • *alloy steels* • *armor plate* • *clutch plate steels* • *tillage steels* • *soft center steel* • *shovel steels* • *knife steels* • *saw steels, including high speed hack saw blade steels* • *Tem-Cross steel* • *heat-resisting steels* • *stainless steels* • *IngAclad stainless-clad steel*

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B-W
PRODUCTION

Ingersoll STEEL DIVISION

If you will check over these bearings and bearing metals you will undoubtedly find that they meet virtually every sleeve bearing need. They are stock items and are handled by your nearby Johnson Distributor. The range of sizes and types is large. On one type alone . . . Johnson Cast Bronze GP Sleeve Bearings . . . there are over 900 sizes . . . 48 inside diameters from $\frac{1}{4}$ inch to $4\frac{1}{2}$ inches, in various wall thicknesses and lengths. Every item is a top quality product and will give long, dependable bearing service. Ask your local Johnson Distributor about this famous line.

JOHNSON BRONZE COMPANY, 550 South Mill Street, New Castle, Pa.

Sleeve Bearing Headquarters Since 1901

JOHNSON B BEARINGS

Sleeve-Type

SNT Program

Ultrasonic Equipment for High-Precision Thickness Measurements—Peter K. Bloch, vice-president, Branson Instrument Co.

Geophysics—Its Relation to Nondestructive Testing—Peter Dehlinger and Sam Wenk, Battelle Memorial Institute.

Alternate: Economic Industrial Applications of the Metroscope—Mr. Mann, Walter Kidde and Co.

Alternate: Future Trends in Industrial Ultrasonic Testing—William I. Bendz, Sperry Products Inc.

Wednesday, Oct. 22, 2 p.m.

New Electromagnetic Nondestructive Tests To Lower Production Costs

Industrial Evaluation of Search Coil Flaw Detection Techniques—Carleton E. Hastings, Watertown Arsenal.

A Metal Comparator for the Inspection and Classification of Metals—B. M. Smith, General Engineering Laboratory, General Electric Co.

Application of Foerster-Type Instruments in American Industry—Representative of Magnaflux Corp.

Alternate: New Nondestructive Test Instruments Developed by the Institut Dr. Foerster — Friedrich Foerster, Institut Dr. Foerster, Germany.

Thursday, Oct. 23, 9 a.m.

Using Liquid-Penetrant and Electrical Nondestructive Test Methods To Lower Industrial Production Costs

Comparison of Materials for Liquid Penetrant Inspection — Hamilton Migel and Taber de Forest, Magnaflux Corp.

Lowering Production Costs With Dy-Chek and Chek-Spek Dye Penetrants—Representative of Turco Products Inc.

Application of Wire-Resistance Strain Gages to Lower Production Costs—Francis G. Tatnall, Baldwin-Lima-Hamilton Corp.

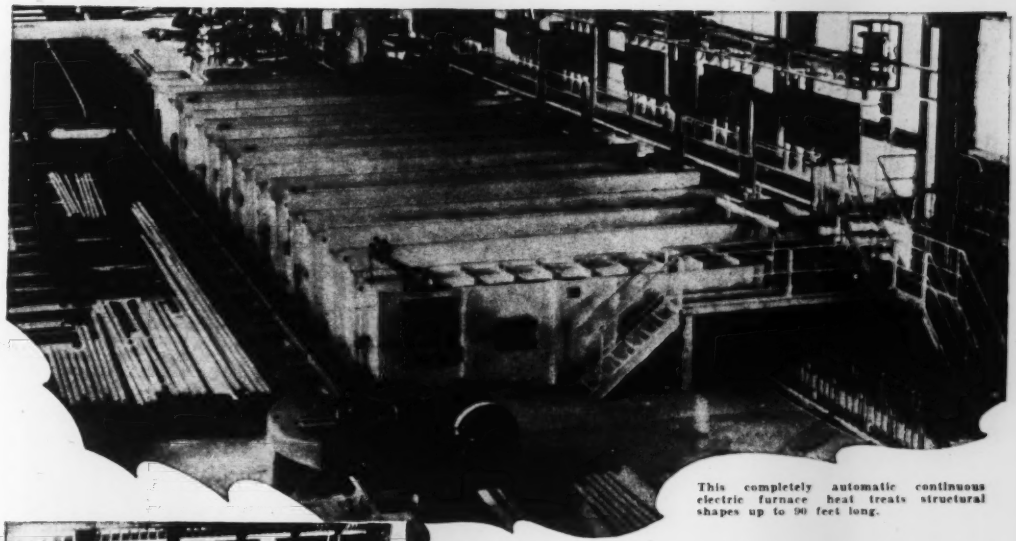
Alternate: Measurement of Ionization in Dielectric Structures—A New Nondestructive Test for Electrical Insulating Materials—D. A. Lupfer, General Electric Co.

Thursday, Oct. 23, 2 p.m.

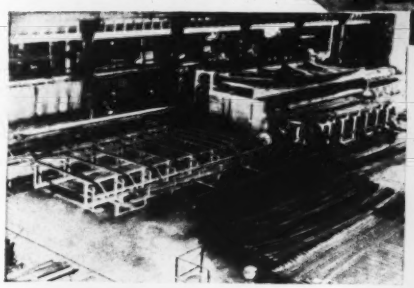
Mehl Honor Lecture

Society for Nondestructive Testing Annual Lecture Honoring Dr. Robert F. Mehl—Donald T. O'Connor, chief, radiology section, Naval Ordnance Laboratory.

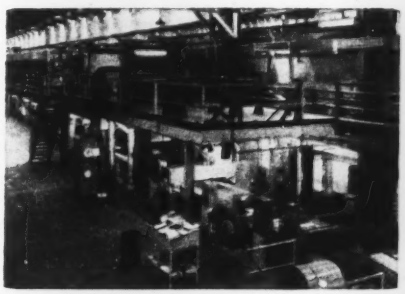
Annual Business Meeting



This completely automatic continuous electric furnace heat treats structural shapes up to 90 feet long.



An EF gas fired heat treating furnace, quenching machine and rod straightener—handles rods up to 30 ft. in length, continuously.



A large capacity EF continuous strip normalizing, annealing and galvanizing unit. This combination gas fired radiant tube and electrically heated installation is over 400 feet long.

93 ft. Long x 26 ft. Wide Maintains Temperature ±5°

Because of its great number of successful, large and unusual furnace installations The Electric Furnace Co. has justly earned an enviable reputation for solving difficult production furnace problems.

The furnaces shown are typical examples — the large aluminum furnace above is completely automatic — large structural shapes up to 90 ft. in length are automatically charged into the furnace, carried across the heating chamber and discharged through a spray quench — everything is automatic.

The heating chamber is 93 ft. long by 26 ft. wide. Despite its unusual size it maintains a uniform temperature throughout the entire heating chamber.

The furnace shown above, at left, is another outstanding installation — this equipment heats, quenches and straightens rods up to 30 ft. in length and was the first successful continuous furnace of this type built for this process. Several somewhat similar installations have since been made.

The view at left shows one of several large capacity continuous units we have built for processing ferrous and non-ferrous strip.

Other outstanding production furnace installations include furnaces for bright annealing both ferrous and non-ferrous strip, wire, tubing and other products . . . furnaces for the production heat treatment of tank armor castings, cartridge cases, shell forgings, bomb and gun parts, machine gun cartridge clips, aircraft and aircraft engine parts, aluminum and magnesium castings, bolts, springs, and many other products.

If you have a difficult production furnace problem put it up to our experienced engineers — no job is too large or too unusual.

We specialize in building *production* furnaces.

Gas-Fired, Oil-Fired EF and Electric Furnaces

for any Process, Product or Production

THE ELECTRIC FURNACE CO.

WILSON ST. at PENNA. R. R. *Salem - Ohio*

Canadian Associates • CANEFCO LIMITED • Toronto 1, Canada

MEETING MILITARY SPECS IS AN OLD STORY FOR T-W USERS

Specifications Mil-W-6860 and 6858 (formerly AN-W-30 and 32) and Taylor-Winfield resistance welding equipment have been partners for years. From Taylor-Winfield you can have the efficient Tri-Phase DC or Single Phase Spot and Seam AC welders in many sizes and styles. From Taylor-Winfield you can obtain all the engineering data or field assistance you need to meet your problem, and the welders to do the job. Let T-W know your requirements. Write, wire or phone.

RESISTANCE WELD

AIRCRAFT FRAMES
JET ENGINE PARTS

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PROJECTILES
WEAPONS
CONTAINERS

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ALUMINUM ALLOYS
STAINLESS STEELS
NICKEL ALLOYS
LOW ALLOY STEELS
TITANIUM ALLOYS
LOW CARBON STEEL
ALLOYS OF MAGNESIUM, COPPER AND OTHER MATERIALS

Sales and Service In All Principal Cities

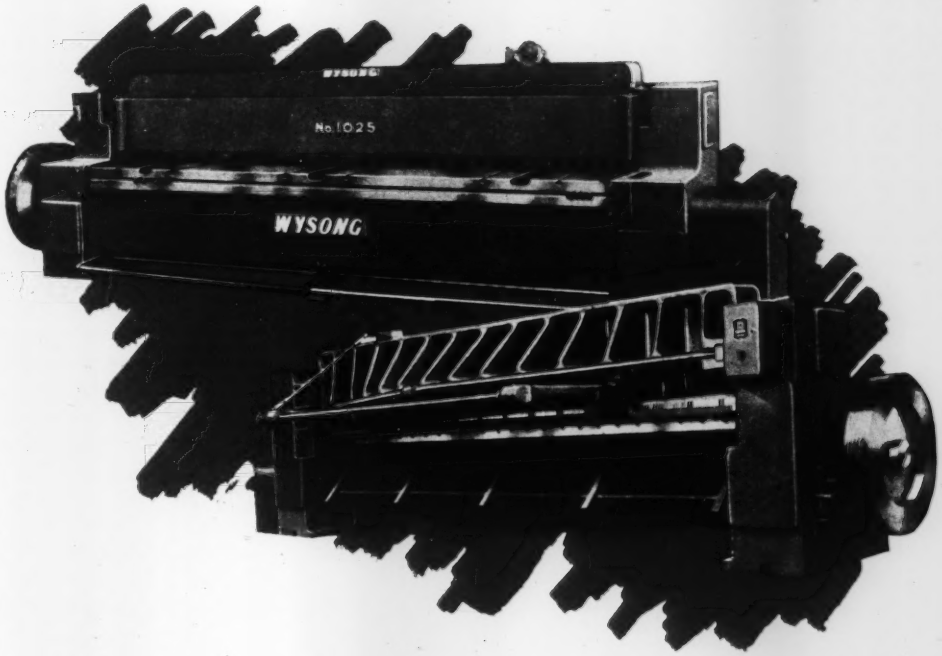
Resistance Welders Since 1887

TAYLOR-WINFIELD
RESISTANCE WELDERS

THE TAYLOR-WINFIELD COMPANY • WARREN, OHIO

EXHIBITORS
At the Metal Show

EXHIBITOR	BOOTH NO.
A. B. C. Die Casting Machine Co., Chicago	1563
ACCO Steel Casting Division, Bridgeport, Conn.	706
Acme Mfg. Co., Detroit	1716
Acme Steel Co., Chicago	1977
Air Products Inc., Allentown, Pa.	1662
Air Reduction Sales Co., New York	1623
Ajax Electric Co. Inc., Philadelphia	624
Ajax Electrothermic Corp., Philadelphia	624
Ajax Engineering Corp., Philadelphia	624
Ajusto Equipment Co., Toledo, O.	1376
Allegheny Ludlum Steel Corp., Pittsburgh	141
Allen Mfg. Co., Hartford, Conn.	1825
Allied Chemical & Dye Corp., New York	1019
Allison Co., Bridgeport, Conn.	1409
Alloy Engineering & Casting Co., Inc., Champaign, Ill.	507
Alloy Metal Wire Co. Inc., Prospect Park, Pa.	550
Alloy Rods Co., York, Pa.	448
Alpha Metals Inc., Brooklyn, N. Y.	1862
Alvey-Ferguson Co., Cincinnati	530
American Brake Shoe Co., New York	130
American Brass Co., Waterbury, Conn.	241
American Chain & Cable Co. Inc., Bridgeport, Conn.	706
American Cyanamid Co., New York	1344
American Cystoscope Makers, New York	242
American Gas Association, New York	1601, 1910
American Gas Furnace Co., Elizabeth B, N. J.	1701, 1601, 1910
American Machine & Foundry Co., New York	1124
American Machine and Metals Inc., E. Moline, Ill.	1239
American Machinist, New York	1263
American Manganese Steel Division, American Brake Shoe Co., Chicago	130
American Metal Market, New York	1871
American Metaseal Corp., New York	1138
American Nickeloid Co., Peru, Ill.	1378
American Non-Gran Bronze Co., Berwyn, Pa.	1946
American Optical Co., Buffalo	442
American Platinum Works, Newark, N. J.	1972
American Pullmax Co. Inc., Chicago	1449
American Silver Co. Inc., Flushing, N. Y.	709
American Society for Metals, Philadelphia Chapter	1018
American Society for Metals, National Office	1619
American Wheelabrator & Equipment Corp., Mishawaka, Ind.	1749
Ampco Metal Inc., Milwaukee	1217
Amplex Mfg. Co., Detroit	1954
Ansco Division, General Aniline & Film Corp., New York	929
Applied Research Laboratories, Glendale, Calif.	1757
Arcair Co., Bremerton, Wash.	1132
Arcos Corp., Philadelphia	309
Aronson Machine Co., Arcade, N. Y.	718
Arwood Precision Casting Corp., Brooklyn, N. Y.	1758
Atlas Press Co., Kalamazoo, Mich.	602
Atomic Energy of Canada Ltd., Ottawa	1479
Automatic Temperature Control Co. Inc., Philadelphia	1768



WYSONG 1/4 INCH PLATE SHEARS

No matter how you look at it you can see the massive, rigid construction of the WYSONG ¼-inch series . . . made in 4, 6, 8, and 10 feet cutting lengths. Bed, end frames, and knife bar are one-piece Hi-tensile castings. Bearing surfaces between end frames and table, and gibbed ways for hold-down and knife bar travel are hand scraped for perfect fit and true squaring.

A clearly visible cutting line makes it easy to cut to a scribed line. Slotted metal finger guard, mounted on hold-down, protects fingers without obstructing view.

An automatic, mechanically operated *hold-down* provides powerful, positive hold down action. The simplicity of the roller and cam action makes it sure and trouble free. Individual compression springs in each foot compensate for varying thicknesses in metal being sheared . . . Front operated, ball-bearing *back gauge*, adjustable to .0078 (1/128th) of an inch, is standard equipment. A *power operated back gauge*, in ranges of 24 and 36 inches can be furnished at extra cost . . . Powerful WYSONG *jaw-type clutch* has built-in non-repeat unit.

For performance . . . feature for feature and dollar for dollar, you can't beat the value of WYSONG squaring shears. Compare the WYSONG line with others in the field . . . and for shear satisfaction, buy WYSONG.

WYSONG builds Squaring Shears in cutting lengths from 3 feet through 12 feet, in motorized, air-power and foot-power models; O. B. I. Presses; Slip Roll Formers; and Rotary Combination Machines. See your dealer or write factory for full information.

Wysong and Miles Company, Greensboro, North Carolina

Illustrated above: Wysong No. 1025, Cap. 10 ft., ¼in., mild steel

WYSONG

it's the Reliability of HEVI DUTY FURNACES . . .

THAT ASSURES MORE PRODUCTION • LESS "DOWN TIME" • UNIFORM RESULTS • FEWER REJECTS •

Mr. E. W. Krueger, Operations Manager of Cleveland Pneumatic Tool Co., says, "The uniformity of temperature in our Hevi Duty Pit Type Furnaces allows us to heat treat large air-craft forgings at heats and speeds adequate to meet the most exacting requirements."

These special pit type furnaces with a work space of 48" dia. x 156" deep are typical of furnaces designed and built by Hevi Duty Electric Company to solve unusual heat treating problems.

The Hevi Duty return bend type heating elements are zoned to provide uniform temperatures in the entire depth of the work chamber. For more information on how Hevi Duty Pit Type Furnaces can help you . . .

Write for Bulletin HD-451

HEVI DUTY

HEVI DUTY ELECTRIC COMPANY

MILWAUKEE 1, WISCONSIN

Heat Treating Furnaces . . . Electric Exclusively

Dry Type Transformers *Constant Current Regulators*

EXHIBITOR	BOOTH NO.
Automotive Industries, Detroit	1468
Avon Tube Division, Rochester, Mich.	1961
Babcock & Wilcox Tube Co., New York	340
Baird Associates Inc., Cambridge, Mass.	416
Baker & Co. Inc., Newark, N. J.	1210
Baldwin-Lima-Hamilton Corp., Philadelphia	1520
Barber-Colman Co., Rockford, Ill.	641
Bausch & Lomb Optical Co., Rochester, N. Y.	405
Bell & Gossett Co., Morton Grove, Ill.	1772
Bendix-Westinghouse Automotive Air Brake Co., Elyria, O.	1710
Beryllium Corp., Reading, Pa.	1539
Black Drill Co., Cleveland	1350
Blackstone Mfg. Co. Inc., Chicago	1382
Blakeslee, G. S., & Co., Cicero, Ill.	540
Bowser Inc., Ft. Wayne, Ind.	1658
Brainard Steel Division, Warren, O.	660
Bridgeport Brass Co., Bridgeport, Conn.	1035
Bruning, Charles, Co. Inc., New York	1440
Brush Development Co., Cleveland	1358
Buck Tool Co., Kalamazoo, Mich.	905
Buehler Ltd., Chicago	208
Bundy Tubing Co., Detroit	1839
Cam-Lok Division, New York	1116
Campbell Machine Division, American Chain & Cable Co. Inc., Bridgeport, Conn.	706
Carboloy Department, General Electric Co., Detroit	816
Carlin, J. A., Co. Inc., Bala Cyawyd, Pa.	1310
Carpenter Steel Co., Reading, Pa.	350
Casting Engineers Inc., Chicago	805
Challenge Machinery Co., Grand Haven, Mich.	932
Chase Brass & Copper Co., Waterbury, Conn.	1220
Chem-Fin Corp., Lansdale, Pa.	1730
Chicago Metal Hose Corp., Haywood, Ill.	534
Chicago Rivet & Machine Co., Bellwood, Ill.	1819
Chicago Tool & Engineering Co., Chicago	1023
Chrysler Corp., Detroit	1954
Cincinnati Milling Machine Co., Cincinnati	1610
Cities Service Oil Co., New York	1309
Climax Molybdenum Co., New York	515
Clinton Machine Co., Detroit	610
Coles Cranes Inc., Chicago	1369
Collins Micro-Flat Co., Los Angeles	1281
Commander Mfg. Co., Chicago	531
Commercial Shearing & Stamping Co., Youngstown	1616
Continental Industrial Engineers Inc., Chicago 1601,	1910
Continental Tooling Service Inc., Dayton, O.	1027
Cooper Metallurgical Laboratory, Cleveland	923
Crane Packing Co., Chicago	811
Crucible Steel Co. of America, New York	104
Curtis Machine Division, Lincoln Park Industries Inc., Jamestown, N. Y.	937
Dake Engine Co., Grand Haven, Mich.	1761
Deepfreeze Distributing Corp., N. Chicago, Ill.	1320
Delaware Tool Steel Corp., Wilmington, Del.	1275
Delta Power Tool Division, Bay City, Mich.	1650
de Sanno, A. P., & Son Inc., Phoenixville, Pa.	1252
Detrex Corp., Detroit	1849
DeWalt Inc., Lancaster, Pa.	1120
Diamond Iron Works Inc., Minneapolis	1557
Distillation Products Industries, Rochester, N. Y.	1428
Diversey Corp., Chicago	646

EXHIBITOR	BOOTH NO.
Diversified Metal Products Co., Los Angeles	1767
DoAll Co., Des Plaines, Ill.	524
Dow Chemical Co., Midland, Mich.	730
Dow Furnace Co., Detroit	1315
Drever Co., Philadelphia	1980
Driver Co., Newark, N. J.	521
Driver-Harris Co., Harrison, N. J.	1919
East Shore Machine Co., Cleveland	1455
Eaton Manufacturing Co., Massillon, O.	912
Eclipse Fuel Engineering Co., Rockford, Ill. 1926, 1601,	1910
Ekstrand & Tholand Inc., New York	1567
Elastic Stop Nut Corp. of America, Union, N. J.	640
Eldorado Mining & Refining Ltd., Ottawa, Canada	1479
Electric Furnace, Salem, O.	341
Electro-Alloys Division, American Brake Shoe Co., Elyria, O.	130
Electro Arc Mfg. Co., Detroit	1778
Elox Corp. of Michigan, Clawson, Mich.	1355
Empire Products Inc., Cincinnati	1116
Engineered Castings Division, American Brake Shoe Co., New York	130
Enthone Inc., New Haven, Conn.	1867
Ercona Corp., New York	920
Erico Products Inc., Cleveland	1482
Esbenson, Iver J., Co., Denver, Colo.	916
Eutectic Welding Alloys Corp., New York	1001
Fahralloy Co., Harvey, Ill.	1969
Fawick Airflex Co. Inc., Cleveland	1960
Ferner, R. Y. Co. Inc., Boston	1123
Firth Sterling Inc., Pittsburgh	421
Flexonics Corp., Maywood, Ill.	534
Fostoria Pressed Steel Corp., Fostoria, O.	1571
Foundry, Cleveland	1733
Gas Appliance Service Inc., Chicago 1920, 1601,	1910
Gehnrich & Gehnrich Inc., Long Island, N. Y. 1916, 1601,	1910
General Alloys Co., Boston	204
General Aniline & Film Corp., New York	929
General Chemical Division, Allied Chemical & Die Corp., New York	1019
General Electric Co., Apparatus Sales Division, Schenectady, N. Y.	251
General Electric Co., X-Ray Department, Milwaukee	1549
Globe Stamping Division, Hupp Corp., Cleveland	1354
Goodrich, B. F., Co., Akron	617
Graham Mfg. Corp., Ferndale, Mich	933
Gray Co. Inc., Minneapolis	924
Gray Iron Founders' Society Inc., Cleveland	1340
Gregory Industries Inc., Lorain, O.	1850
Griffith-Raguse & Co. Inc., Philadelphia	1310
Gulf Oil Corp., Pittsburgh	1515
H & H Tube & Mfg. Co., Detroit	1487
H P L Mfg. Co., Cleveland	1951
Hacker, Wm. J. & Co. Inc., New York	1279
Handy & Harman, New York, N. Y.	110
Hammond Machinery Builders Inc., Kalamazoo, Mich.	1130
Harnischfeger Corp., Milwaukee	1525
Harper Electric Furnace Corp., Buffalo	1857
Harshaw Chemical Co., Cleveland	1420
Hayes, C. I., Inc., Providence, R. I.	1262
Haynes Stellite Co., Kokomo, Ind.	1202
Heath Engineering Co., Ft. Collins, Colo.	916
Heintz Mfg. Co., Philadelphia	1668
Heli-Coil Corp., Danbury, Conn.	1953
Heller Machine Co., New York	1620

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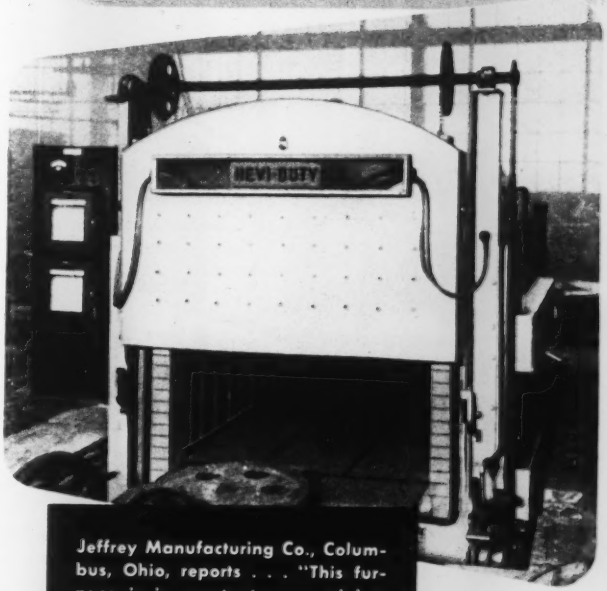

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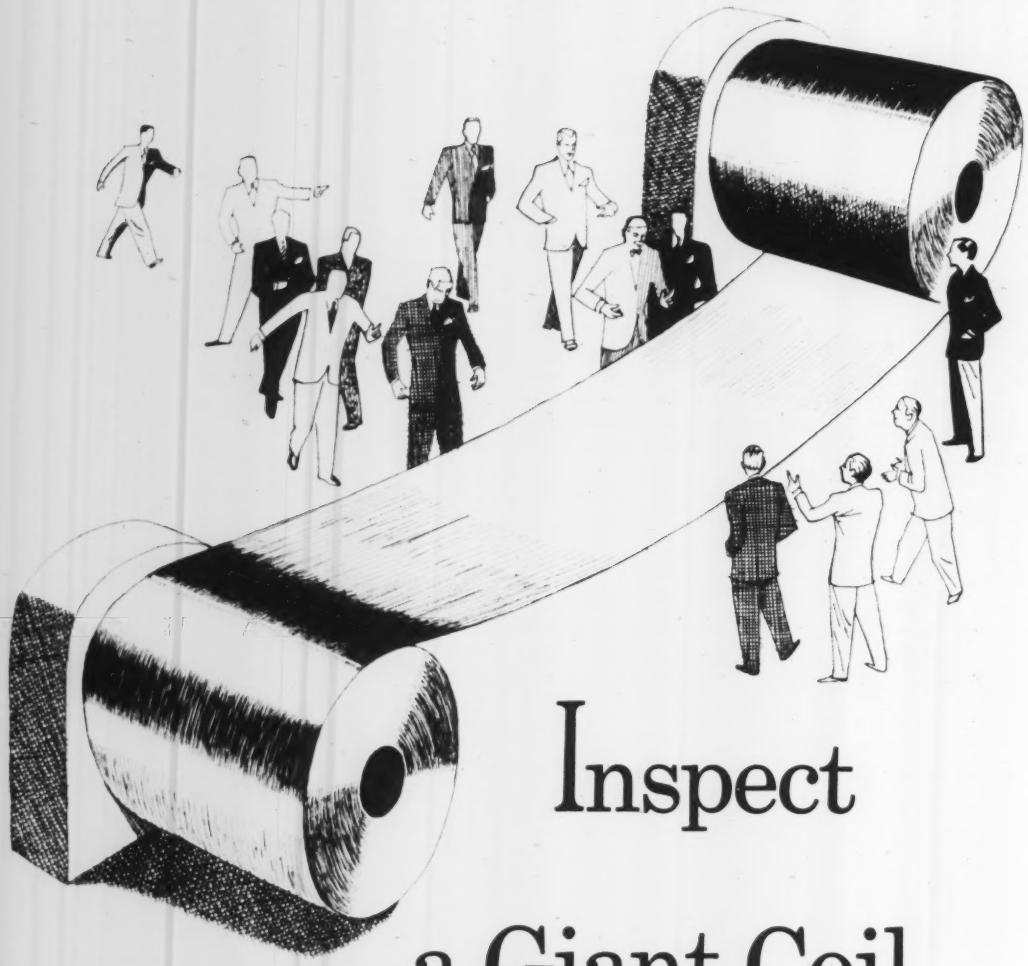

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See why SCOVILL CONTINUOUS-CAST BRASS STRIP brings to fabricators greatest inherent soundness and uniformity...

Commemorating 150 years of craftsmanship in metals – Scovill presents in action its early hand method for brass bar casting, compared to its continuous-casting process of today.

Compare brass bar casting methods of 1802 and 1952 at Scovill's exhibit in the National Metal Exposition

To commemorate 150 uninterrupted years of craftsmanship in metals, the Brass Mill Products Division of Scovill Manufacturing Company is presenting, in action, its early hand methods for melting and casting the first brass bars made in America, contrasted to its present-day continuous-casting process.

Here, you will see a huge coil of Scovill brass, constantly winding and unwinding before your eyes. You can inspect both sides of this ever-moving strip and see what is meant by inherent *soundness* and *uniformity*. You will see why the last pound of your order for Scovill continuous-cast brass is essentially the same as the first pound.

At Scovill's exhibit you will learn why "*You can't buy better brass!*"

Visit Scovill's Booth No. 1685, National Metal Exposition, Commercial Museum, Philadelphia, October 20-24.

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Phosphorized Admiralty Condenser Tube

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SCOVILL 150 YEARS OF CRAFTSMANSHIP IN METALS 1802-1952

1802—Early Scovill craftsmen employed these hand methods for melting and casting first brass bars used in this country for subsequent cold-rolling into strip form. Output of these tiny brass bars, weighing 1 lb each, was only about 5 to 10 lbs. hourly.

1952—Today Scovill's unique continuous-casting process is capable of producing up to 30,000 lbs. per hour of rectangular-shaped brass bars. The Scovill flat-metal continuous-casting machine, only one of its kind in the brass industry, will be represented at the Exposition by a half size model—operating in natural color in motion. Since 1949, Scovill has offered commercially 2,000 lb. non-welded 24 in. wide brass coils; 3,000 lb. coils will be available in the near future.

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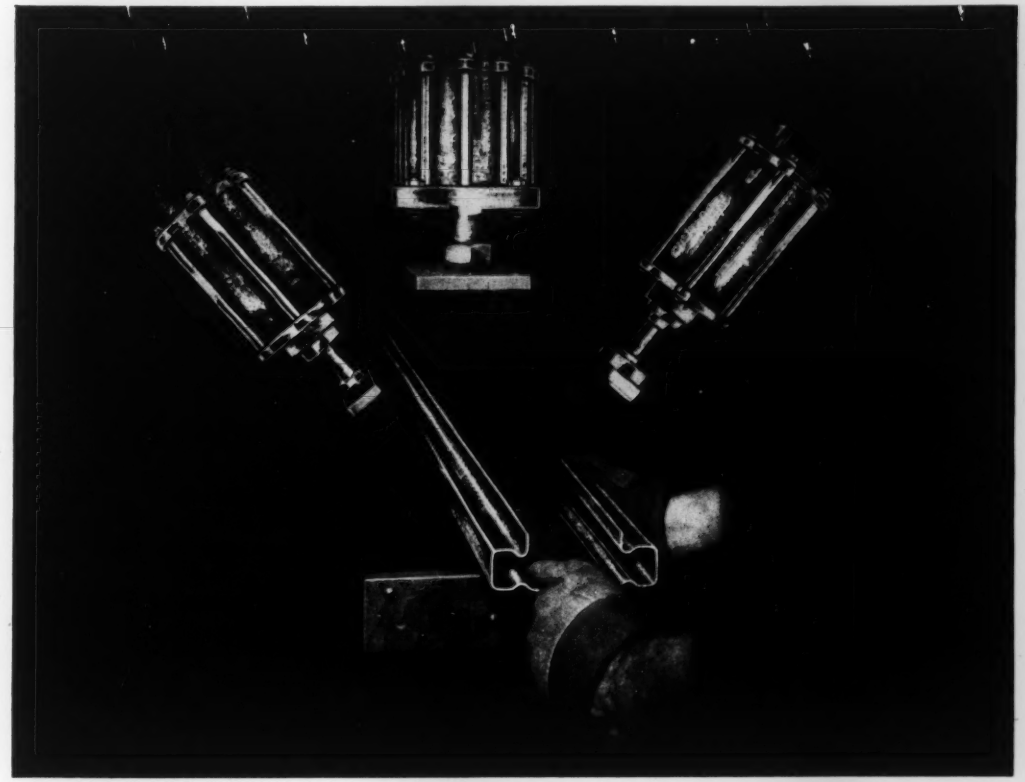
VERTICAL LIFTS • PNEUMATIC TUBE SYSTEMS

EXHIBITOR	BOOTH NO.
Heppenstall Co., Pittsburgh	1572
Higbie Mfg. Co., Rochester, Mich.	1961
Hitchiner Mfg. Co., Inc., Manchester, N. H.	817
Hones, Charles A., Inc., Baldwin, N. Y.	1912, 1601, 1910
Houghton, E. F., & Co., Philadelphia	724
Howard Foundry Co., Chicago	501
Hupp Corp., Detroit	1354
Illinois Testing Laboratories Inc., Chicago	1457
Induction Heating Corp., Brooklyn, N. Y.	1870
Industrial Heating Equipment Co., Detroit	1439
Industrial Press, New York	1339
Industrial Publishing Co., Cleveland	1361
Industrial Tectonics Inc., Ann Arbor, Mich.	919
Institute of Industrial Launderers, Chicago	1362
International Nickel Co. Inc., New York	230, 324
Invincible Vacuum Cleaner Mfg. Co., Dover, O.	1256
Ipsen Industries Inc., Rockford, Ill.	131
Iron Age, New York	1842
Janney Cylinder Co., Philadelphia	1327
Jarrell-Ash Co., Boston	1205
Jensen Specialties Inc., Detroit	1415
Johnson, S. C. & Son Inc., Racine, Wis.	1119
Jones, C. Walker, Co., Philadelphia	1257
K S M Products Inc., Merchantville, N. J.	834
Kanthal Corp., Southport, Conn.	1266
Kearney & Trecker Corp., Milwaukee	1941
Kelite Products Inc., Los Angeles	1260
Kelley-Koett X-Ray Corp., Covington, Ky.	1809
Kemp, C. M., Mfg. Co., Baltimore	1801, 1601, 1910
Kennametal Inc., Latrobe, Pa.	1319
Kerns, L. R., Co., Chicago	651
Keystone Drawn Steel Co., Spring City, Pa.	1965
King, Andrew, Narberth, Pa.	121
Knapp Mills Inc., New York	808
Kold-Hold Mfg. Co., Lansing, Mich.	1462
Latrobe Steel Co., Latrobe, Pa.	1649
Leeds & Northrup Co., Philadelphia	304
Leitz, E., Inc., New York	1343
Lepel High Frequency Laboratories Inc., New York	1114
Lincoln Electric Co., Cleveland	140
Lincoln Park Industries Inc., Lincoln Park, Mich.	937
Lindberg Engineering Co., Chicago	330
Linde Air Products Co., New York	1202
Lynchburg Foundry Co., Lynchburg, Va.	1927
Machine Design, Cleveland	1733
Machinery, New York	1339
Magna Engineering Corp., San Francisco	751
Magnaflux Corp., Chicago	537
Magnetic Analysis Corp., New York	518
Mahr Mfg. Co., Minneapolis	1557
Makepeace, D. E., Co., Attleboro, Mass.	560
Malayan Tin Bureau, Washington	858
Mall Tool Co., Chicago	1276
Mallory, P. R., & Co. Inc., Indianapolis	1950
Manco Mfg. Co., Bradley, Ill.	1480
Marlie Trading Inc., New York	1280
Martindale Electric Co., Cleveland	1762
Master Builders Co., Cleveland	1777
Materials & Methods, New York	1454
McGraw-Hill Publishing Co. Inc., New York	1263



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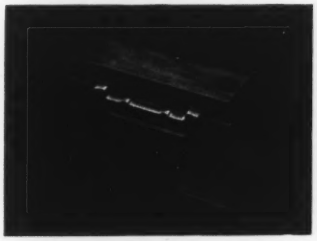
NEW TOOLS FOR METAL FORMING

There's a new source of tools for the metalworking industries—*densified wood*, product of the union of wood and BAKELITE Phenolic Resins. Aircraft part templates, bearings, automotive part dimension gauges, drill jigs, and foundry patterns are already being made from this unusual material. Its advantages—high impact strength, comparatively light weight, ease of repair, and economy.



Densified wood, in the form known as Formica "Gauge-wood," is made into tools that maintain their exact size and shape under variable conditions of heat and moisture. It is dimensionally stable, resistant to water, chemical attack, abrasion, and warping. It can be bored, threaded, tapered, grooved or machined to close tolerances, then buffed to a high surface luster. It may be altered or repaired quickly and economically by patching.

Cross-laminated veneers are impregnated with BAKELITE Phenolic Resins and pressed to 50% of the original thickness to form densified wood, making it a hard, compact, wood-resin structure. Harder than any solid wood, lighter than any solid metal, it is well suited to jobs requiring strength, stability, and accuracy. It may be useful in your operations. For information, write Dept. DZ-49, requesting a copy of booklet H-12, "Densified Wood Made with BAKELITE Phenolic Resins."

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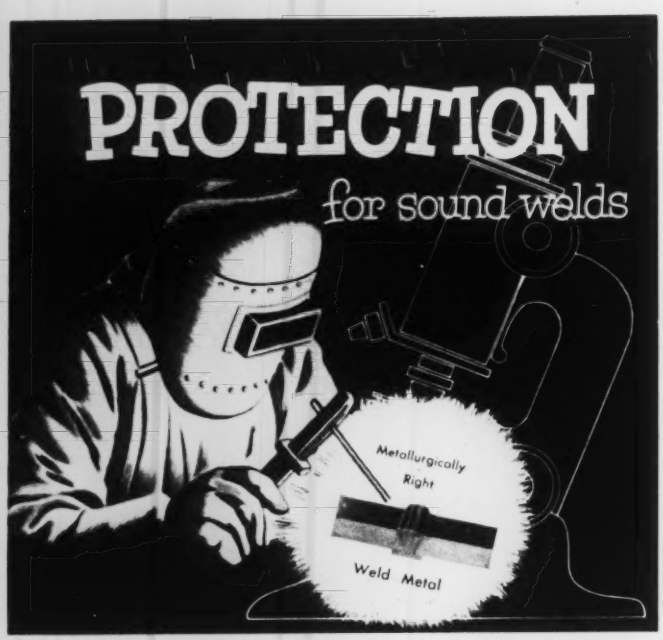

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EXHIBITOR	BOOTH NO.
Mechanical Handling Systems Inc., Detroit	1472
Metal Products Sales Co., W. Hartford, Conn.	817
Metal Progress, Cleveland	1619
Metal & Thermit Corp., New York	430
Metals & Controls Corp., Attleboro, Mass.	1816
Metals Review, Cleveland	1619
Metalweld Inc., Philadelphia	1272
Metlab Co., Philadelphia	1007
Michiana Products Corp., Michigan City, Ind.	1240
Micrometrical Mfg. Co., Ann Arbor, Mich.	1458
Mid-West Abrasive Co., Owosso, Mich.	1024
Miller Electric Mfg. Co., Appleton, Wis.	631
Milne, A. & Co., New York	506
Milton Equipment Co., Philadelphia	1562
Minneapolis-Honeywell Regulator Co., Minneapolis	211
Morrison Industries Inc., Bedford, O. 1804, 1601,	1910
Morton Gregory Corp., Toledo, O.	1850
National Bearing Division, American Brake Shoe Co., St. Louis	130
National Carbon Co., Union Carbide & Carbon Corp., New York	1202
National Cored Forgings Co., S. Norwalk, Conn.	151
National Cylinder Gas Co., Chicago	1989
National Diamond Laboratory, New York	1477
National Industrial Publishing Co., Pittsburgh	1959
National Lead Co., New York	411
National Precision Casting Corp., Clifton Heights, Pa.	1771
National Research Corp., Cambridge, Mass.	1211
National Spectrographic Laboratories Inc., Cleveland	1471
National Torch Tip Co., Pittsburgh	1372
National Welding Supply Association, Philadelphia	1380
Nelco Tool Co. Inc., Manchester, Conn.	1134
Nelson Stud Welding Division, Gregory Industries Inc., Lorain, O.	1850
New Equipment Digest, Cleveland	1733
New Hermes Engraving Machine Corp., New York	1478
Newark Wire Cloth Co., Newark, N. J.	1853
Nicholas Equipment Co., Bellevue, O.	911
North American Philips Co., Inc., New York	1861
Oakite Products Inc., New York	1715
Ohio Crankshaft Co., Cleveland	1377
Ohio Seamless Tube Co., Shelby, O.	1820
Ohio Steel Foundry Co., Lima, O.	1958
Olsen Tinius Testing Machine Co., Willow Grove, Pa.	1419
O'Neil-Irwin Mfg. Co., Lake City, Minn.	630
Opplem Co. Inc., New York	115
Osborn Mfg. Co., Cleveland	729
Pangborn Corp., Hagerstown, Md.	901
Park Chemical Co., Detroit	312
Parker Machine Co. Inc., Brooklyn, N. Y.	1732
Parker Rust Proof Co., Detroit	1909
Partlow Corp., New Hartford, N. Y.	1577
Penton Publishing Co., Cleveland	1733
Philadelphia Bronze & Brass Corp., Philadelphia	1587
Peters-Dalton Co. Inc., Detroit	1410
Philadelphia Electric Co., Philadelphia	1483
Phillips Mfg. Co. Inc., Chicago	635
Physicists Research Co., Ann Arbor, Mich.	1458
Picker X-Ray Corp., New York	441

EXHIBITOR	BOOTH NO.
Pittsburgh Tube Co., Pittsburgh	240
Polyplas.ex International Inc., New York	927
Porter-McLeod Machine Tool Co. Inc., Hartfield, Mass.	1271
Porter Precision Products Co., Cincinnati	1025
Precision Metalsmiths Inc., Cleveland	1461
Precision Products Co., Washington, Pa.	1125
Precision Shapes Inc., Suffern, N. Y.	1015
Precision Welder & Flexapress Corp., Cincinnati	842
Product Engineering, New York	1263
Production Machine Co., Greenfield, Mass.	1540
Progressive Welder Sales Co., Detroit 928,	1105
Pyrometer Instrument Co. Inc., Bergenfield, N. J.	1729
Ransburg Electro-Coating Corp., Indianapolis	1983
Raytheon Mfg. Co., Waltham, Mass.	1815
Reeves Pulley Co., Columbus, Ind.	1553
Rex, J. W. Co., Lansdale, Pa.	1750
Reynolds Metals Co., Louisville, Ky.	1550
Richards, J. A. Co., Kalamazoo, Mich.	1277
Riehle Testing Machines Div., E. Moline, Ill.	1239
Rochester Products Div., General Motors Corp., Rochester, N. Y.	1031
Rockwell Mfg Co., Milwaukee	1650
Rogers Hydraulic Inc., Minneapolis	1558
Rolle Mfg. Co. Inc., Lansdale, Pa.	750
Rolock Inc., Fairfield, Conn.	1810
Ryerson, Joseph T., & Son Inc., Chicago	318
'S' Corrugated Quenched Gap Co., Garfield, N. J.	1119
S & S Machinery Co., Brooklyn, N. Y.	1657
Sales Service Machine Tool Co., St. Paul	1467
Sandvik Steel Inc., New York	402
Scherr, George & Co., Inc., New York	1269
Schrader's Son Division, Brooklyn, N. Y.	1856
Schnell Tool & Die Corp., Salem, O.	1453
Sciaky Bros. Inc., Chicago	1719
Scott, C. U., & Son Inc., Rock Island, Ill.	1228
Scovill Mfg. Co., Waterbury, Conn.	1685
Selas Corp. of America, Philadelphia 1601,	1910
Sentry Co., Foxboro, Mass.	1324
Sharon Steel Corp., Sharon, Pa.	660
Sheldon Machine Co. Inc., Chicago	841
Shell Oil Co., New York	1349
Smith, A. O., Corp., Milwaukee	354
Smith Welding Equipment Corp., Minneapolis	1828
Snap-On Tools Corp., Kenosha, Wis.	1127
Socony-Vacuum Oil Co. Inc., New York	1876
Solventol Chemical Products Inc., Detroit	512
South Chester Corp., Philadelphia	1026
Sparkler Mfg. Co., Mundelein, Ill.	1875
Spencer Turbine Co., Hartford, Conn. 1601,	1910
Sperry Products Inc., Danbury, Conn.	1754
Standard Alloy Co., Cleveland	1250
Standard Die Set Mfgrs. Inc., Providence, R. I.	1640
Standard Electrical Tool Co., Cincinnati	908
Starrett L. S., Co., Athol, Mass.	1843
STEEL, Cleveland	1733
Steel City Testing Machines Inc., Detroit	1416
Steel Founders' Society of America, Cleveland	101
Steel-Parts Mfg. Co., Chicago	1382
Steels Engineering Products (Canada) Ltd., Toronto	1369
Sterling Electric Motors Inc., Los Angeles	1949
Stevens, Frederic B., Inc., Detroit	244

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ARCOS GRADE	A.W.S. SPEC.
Tensilend 70	E7016
Tensilend 100	E10016
Tensilend 120	E12015
Manganend 1M	E9015
Manganend 2M	E10015
Nickend 2	E8015
Chromend 1M	E8015
Chromend 2M	E9015

When you can deposit sound weld metal without changing electrodes to meet different welding positions—and use the same electrode on A-C or D-C current—you're saving time and inconvenience. With few exceptions, all types of Arcos Low Hydrogen Electrodes offer this advantage on a variety of base metals. That means a smaller inventory, since you can safely weld many jobs from start to finish with ONE ELECTRODE. Because Arcos Low Hydrogen Electrodes are "quality controlled," there's no danger of underbead cracking.
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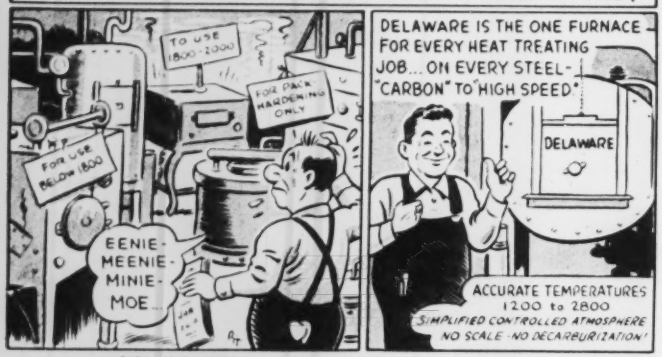
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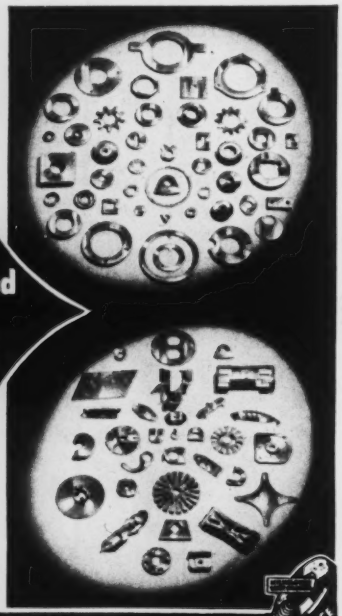

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EXHIBITOR	BOOTH NO.
Stimpson, Edwin B., Co. Inc., Brooklyn	605
Stokes, F. J. Machine Co., Philadelphia	1385
Stone Machinery Co. Inc., Syracuse, N. Y.	551
Stuart, D. A., Oil Co. Ltd., Chicago	1251
Sub Zero Products Mfg. Div., Cincinnati	1320
Sun Oil Co., Philadelphia	1427
Superdraulic Corp., Detroit	1877
Super-Grip Anchor Bolt Co. Inc., Philadelphia	1481
Superior Tube Co., Norristown, Pa.	1630
Surface Combustion Corp., Toledo, O.	231
Sutton Engineering Co., Bellefonte, Pa.	740
Swan-Finch Oil Corp., New York	1032
Taco Heaters Inc., Providence, R. I.	1829
Tempil Corp., New York	155
Texas Co., New York	717
Thread-All Sales Co., Detroit	918
Tide Water Associated Oil Co., New York	1450
Tin Research Institute Inc., Columbus, O.	852
Tincher Products Co., Sycamore, Ill.	1975
Tinnerman Products Inc., Cleveland	1330
Titanium Alloy Mfg. Div., National Lead Co., Niagara Falls, N. Y.	1316
Titanium Metals Corp. of America, N. Y.	120
Tocco Division, Ohio Crankshaft Co., Cleveland	1377
Topper Equipment Co., Rahway, N. J.	1351
Torit Mfg. Co., St. Paul, Minn.	1881
Turco Products Inc., Los Angeles	1028
Tyler Mfg. Co., New York	1280
Uddeholm Co. of America, New York	915
Udylite Corp., Detroit	216
Union Carbide & Carbon Corp., New York	1202
Union Steel Products Co., Albion, Mich.	1216
U. S. Electrical Motors Inc., Los Angeles	760
U. S. Pipe & Foundry Co., E. Burlington, N. J.	702
U. S. Plywood Corp., New York	1282
Upton Electric Furnace Co., Detroit	1519
Vanadium Corp. of America, New York	618
Vapofier Corp., Chicago	1953
Versa-Mil Co., New York	741
Viking Sales Inc., Detroit	928
Waldes Kohinoor Inc., Long Island City N. Y.	1915
Walker-Turner Div., Kearney & Trecker Corp., E. Plainfield, N. J.	1941
Wall Colmonoy Corp., Detroit	1131
Warner Division, Clinton Machine Co., Detroit	610
Waukee Engineering Co., Milwaukee	1223
Webber Appliance Co. Inc., Indianapolis	1368
Welders Supply & Mfg. Co., Cincinnati	1380
Weldwire Co., Philadelphia	1383
Wells Mfg. Co., N. Liberty, Ind.	1678
Westinghouse Electric Corp., Pittsburgh	1510
Weston Electrical Instrument Co., Newark, N. J.	1011
Wheelco Instruments Co., Chicago	641
Whitehead Metal Products Co. Inc., New York	1283
Wiegand, Edwin L., Co., Pittsburgh	1244
Williams, Brown & Earle Inc., Philadelphia	1232
Wilson Mechanical Instrument Div., American Chain & Cable Co. Inc., New York	706
Worthington Pump & Machinery Co., Harrison, N. J.	1720
Zeiss, Carl, New York	920

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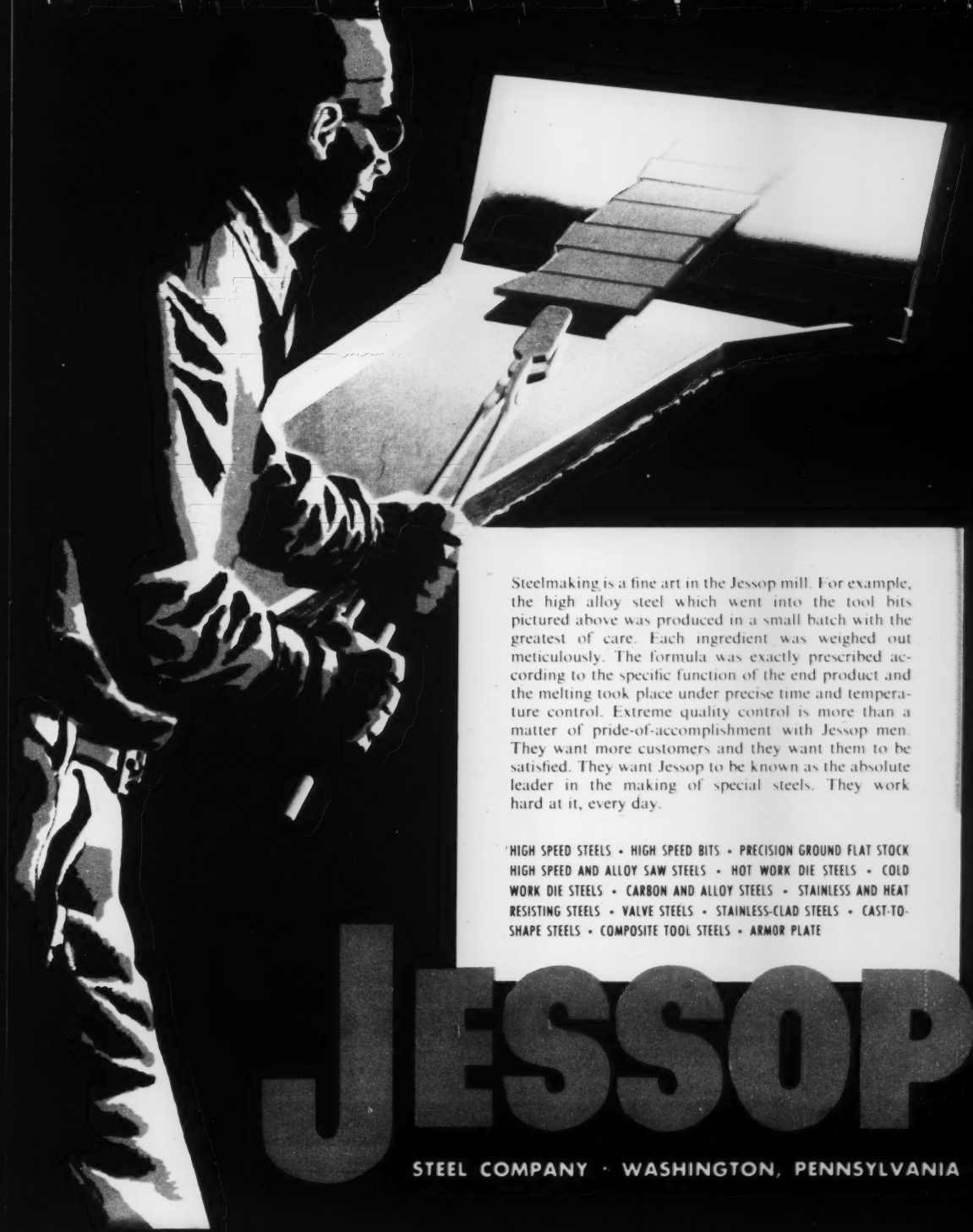

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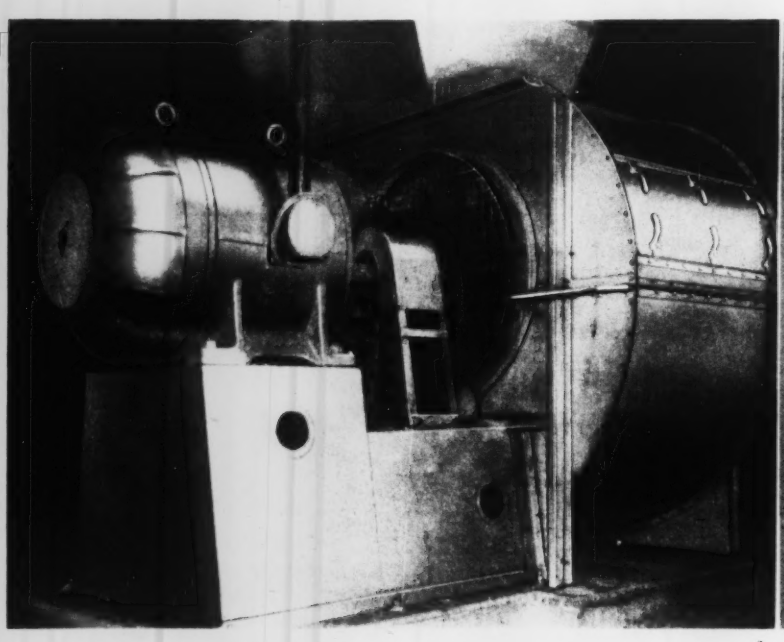
HOW TO SELECT COOLING FANS FOR MILL MOTORS

Since a mill motor fan must operate continuously under heat and pressure, the most economical fan for such service is the one which will stand up. This means a fan built with all the strength and durability of a stoker fan. Thus, in selecting a mill motor fan, look for heavy steel plate in the housing and blades. Look for oversize bearings capable of carrying the load, and look for an extra large shaft turned from a single piece of high grade steel, thrust collar and all.

Finally, look for efficiency that will keep your power cost to a minimum. Efficiency comes from a number of good design features in a fan—properly shaped blades—correctly designed housing scroll—directional inlet vanes—a dynamically balanced wheel.



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... meet these qualifications for durability and efficiency in every respect. Note the rugged construction of the one shown here — on 24-hour duty in a well-known steel mill. If you need a mill motor fan — or any other type — you save money in the long run by specifying "Buffalo".

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The engine, as shipped, was nearly 17 feet high and weighed 214,800 pounds. Width and height clearance had to be checked with several railway systems involved in the routing and travel was restricted to 25 miles an hour in daylight only. Because of clearance problems, a 30,000-pound top section which would have added 2 feet in height was left off. The units for side mounting were also removed.

Ten 5-inch steel channels were welded to the steel floor of the car to serve as supports for the engine. In addition, the big power unit was bolted to the car at six points. At its Texas destination, the engine will be rolled off the flatcar to a ramp that was especially built to accommodate its extreme weight.

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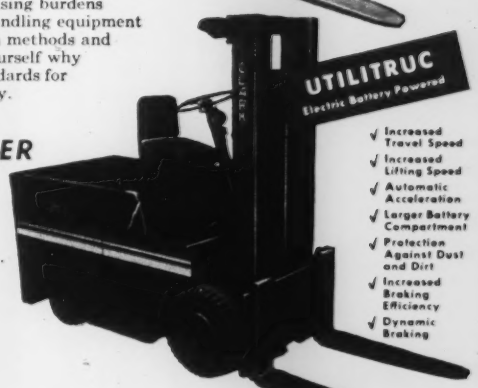

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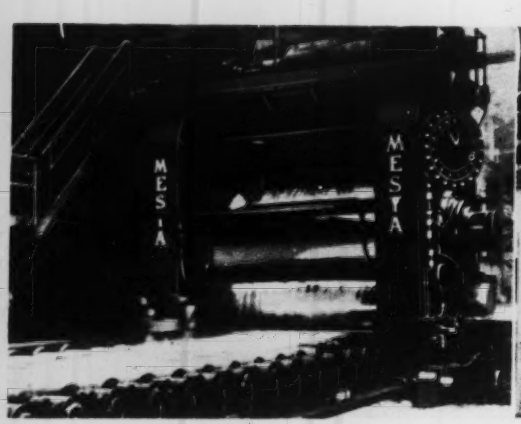
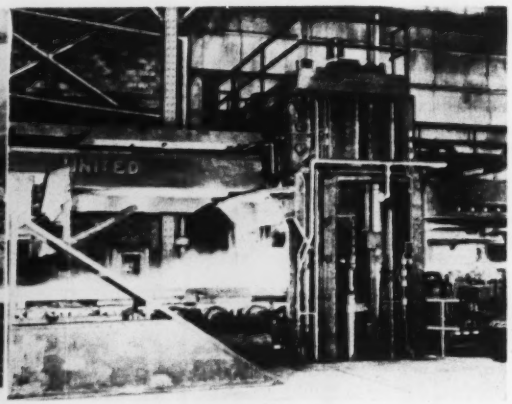


Round-the-clock plate mill operations allow no time for lubrication or repairs due to faulty lubrication making this Farval centralized grease system invaluable to user



Heat and contaminating foreign matter give the lubrication system for this hydraulic slab shear a workout. Trabon's protective system plays an important role

Lubricants Must Survive Rough Treatment

High temperatures, water at high pressures, mills operating at high speeds and presence of mill scale are some of the obstacles that must be surmounted

By M. S. CLARK
Technical & Research Division
The Texas Co.
New York

LUBRICANTS in steel mills must function under a greater variety of probable adverse conditions than in any other industry. These conditions must be considered not only when the lubricants are selected but also when applied. These conditions are:

1. Water often is sprayed on equipment under high pressure. Since it may be worked into the bearings, it will not only contaminate the lubricant but also have a tendency to wash it from the parts it is supposed to lubricate. In a circulating system, this can be very serious. Consequently one of the conspicuous requirements for a circulating oil is that it must separate readily from water.

2. High temperature conditions are often encountered where red hot steel is being processed. This heat is transmitted through machinery being lubricated or is radiated to the operating parts at close range. To meet these conditions greases for roll neck or table roll neck or table roll bearings must be heat resistant. This is measured by their ability to hold their consistency.

3. The same lubricant is often called on to be soft and easily pumpable through centralized system lines at temperatures below 0° F and for distances of several hundred feet.

4. Lubricants are required to lubricate mills running at very high speeds where strip is being rolled at faster than a mile a minute.

5. Oils and greases are also required to lubricate machines running at slow speeds but under extremely high pressures.

Stubborn Emulsions—The circulating oil (2000 to 2500 SSU viscosity at 100° F) used for lubrication of backup roll bearings of hot strip mills often becomes contaminated with water and mill scale, forming stubborn emulsions which are difficult to break. Water from high pressure descaling sprays and roll cooling water leaks past the seals and carries with it fine iron oxide particles from the strip. This material can be so fine that it passes through pressure filters and remains suspended in the oil.

In many hot strip mill circulating oiling systems emulsions begin to form within two or three days after the mill goes into operation on a batch of oil. Emulsions usually show a brownish oil discoloration at first but as the amount of water increases they gradually turn to a pale yellow.

Pumps Emulsify — It has been observed that as soon as the emulsions appear, less water drops out in the settling tank and the water content of the oil climbs rapidly. The circulating pump seems to homogenize the water with the oil and stabilizes the emulsions. If

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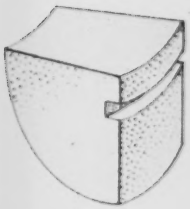

Nose arches for oil heaters were formerly made with special shapes of ordinary firebrick. Switching to quickly moldable Kaocast eliminated need for expensive special-shape inventory . . . minimized delays. In addition, side by side tests proved that Kaocast far outlasted the ordinary firebrick.

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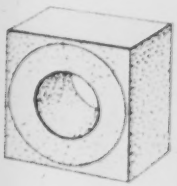

Kaocast was specified for the charging front of a forging furnace, used to heat heavy pipe ends. The reason? Kaocast linings were molded faster . . . give longer service, could be made when convenient and stored 'til needed.

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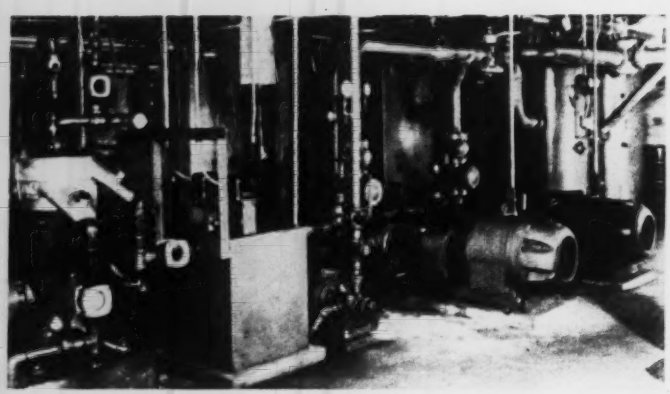


DeLaval custom-built system involving centrifugal treatment insures continued circulation of properly cleaned oil and has ample capacity for cooling

the tank of emulsified oil can be removed from service soon enough the emulsions are more easily broken and water can be removed by heating to 170 to 180° F and holding the oil at rest for a few days.

The longer the tank remains in service the more stable the emulsions become and the more heat is required to break them. It is important that water and mill scale be removed as soon as possible after they enter the bearing oil system.

Numerous Ways—Various procedures are used to overcome this problem. Bearing seals are being continually improved by bearing manufacturers and by maintenance personnel. Damage to seals is being carefully avoided in the roll shops during inspection and installation.

Water legs are installed in the oil return line from each roll stand enabling operators to detect worn or damaged seals before contamination becomes serious. Elaborate reclamation systems, consisting of two storage tanks, heaters, centrifuges and filters, are installed in most mills to remove contaminating materials but it is seldom that the procedure followed by any two mills is the same.

Not Easy — Breaking of tight emulsions is sometimes difficult and the problem is often complicated by the fact that all types of cooling water are involved, some consisting of raw river water having a slight acid reaction and others containing various chemicals. The following methods of breaking emulsions are found effective:

Two storage tanks are used alternately; one containing clean oil is placed in operation while the other containing contaminated oil from previous week's run is being cleaned.

Used oil is heated up to 180° F in the spare tank for several hours. After standing for a few days, free water settles to the bottom and can be drawn off. This will remove most of the water and the remainder can be separated by passing the oil through an auxiliary heater (maintained at 200° F) just before passing into a centrifuge.

Centrifugal purifiers are operated in several ways depending on the preference of individual operators. In some cases the centrifuge is started when the oil system begins operation, and runs continuously. In other cases a centrifuge is only used after water appears in the oil and it is then operated only until water content drops to a desired point. To maintain effective purification it is necessary to use a centrifuge with sufficient capacity to keep the oil in clean condition even if the seals leak badly.

Faster Action—Emulsion breakers are frequently used to hasten the batch treatment and to break stubborn emulsions. Considerable care must be exercised to use only the proper amount (usually around 0.10 per cent) and to get it thoroughly mixed with contaminated oil.

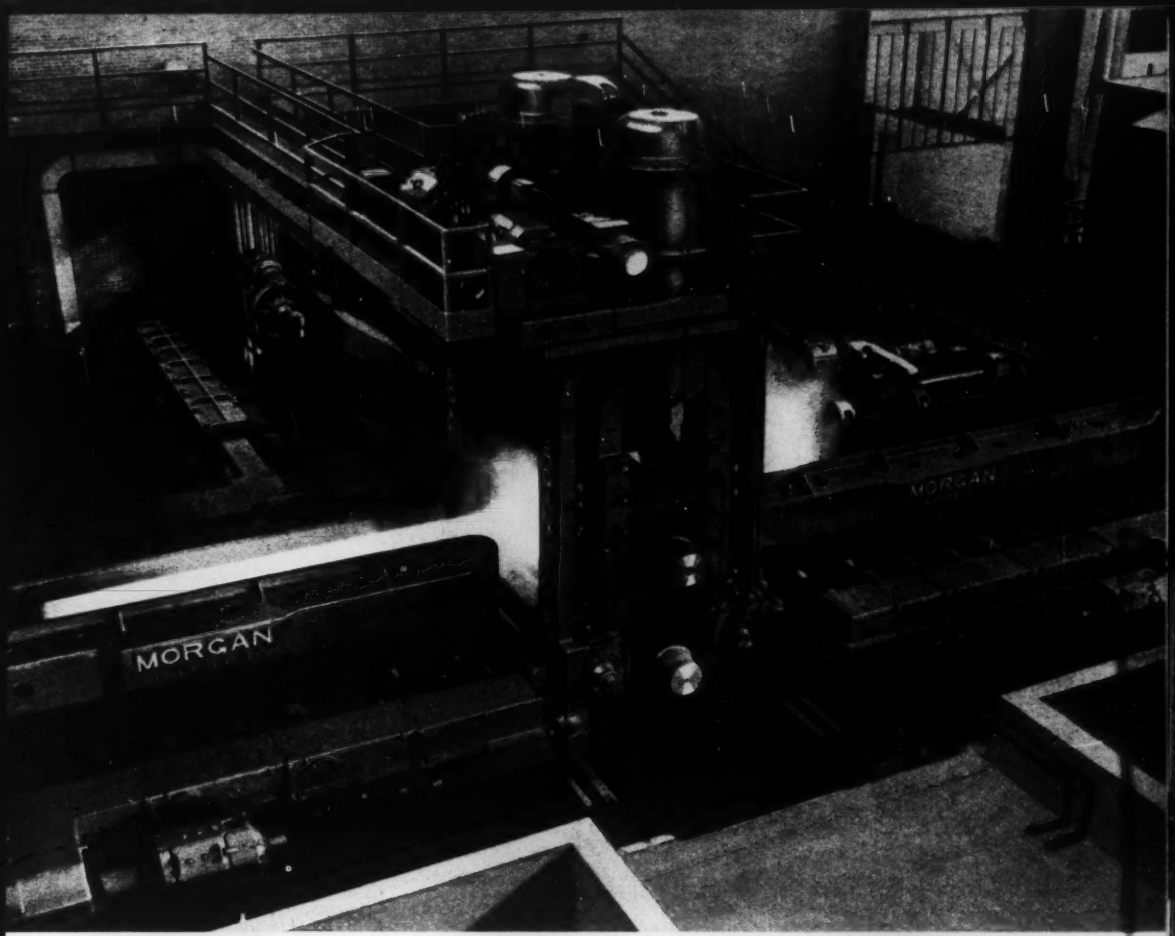
The emulsion breaker should be added slowly in the oil return line to the settling tank or at the pump suction while the mill is operating, approximately 8 hours prior to the change to the spare tank of oil. The oil should then be heated to 180 or 190° F and allowed to settle 24 to 48 hours, after which water should be drawn off.

It has been found that the slower speed hot strip mills are sometimes operated for short periods on oil containing 5 to 25 per cent water without noticeable harmful effect on bearings. In faster cold roll mills operating around 5000 feet per minute, or higher, it is desirable to keep the water content well below 0.5 per cent. In the latter mills operating temperatures usually rise rapidly as the amount of water in the oil increases.

Difference of Opinion—Some operators will not use centrifuges, preferring to batch-treat the oil by heating and allowing to settle for 10 days or more. Settling tanks should be of large capacity in order to facilitate settling of water and mill scale while the oil is in service. Two of the prerequisites of efficient gravity settling are slow movement of oil through the tank and sufficient heat to reduce the viscosity of the oil. Many settling tanks contain no baffles while others have only one near the oil inlet.

With this design, the warm oil from the bearings (being lighter than the cool oil in the tank) enters at one end and flows directly to the float suction at the opposite end of the tank in a matter of a few seconds, therefore, only a small percentage of the available oil in the system is recirculated. The short period of time in the tank does not permit proper settling nor does the incoming oil mix with the bulk of the oil in the settling tank.

Improving Performance—Use of baffles in the settling tank reduces the velocity and allows the incoming oil to remain in the tank for a



Morgan 40" — 2 High Reversing Blooming Mill direct connected to two 3000 Hp. 40/100 Rpm. motors. Top roll and both spindles are hydraulically balanced by individual cylinders connected to an air hydraulic system. Speeds of motor driven screw down, feed rollers, mill tables and manipulator are regulated by variable voltage control.

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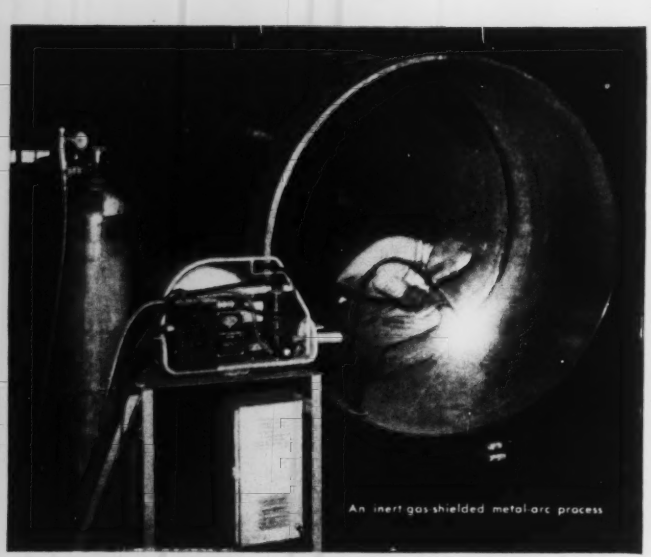

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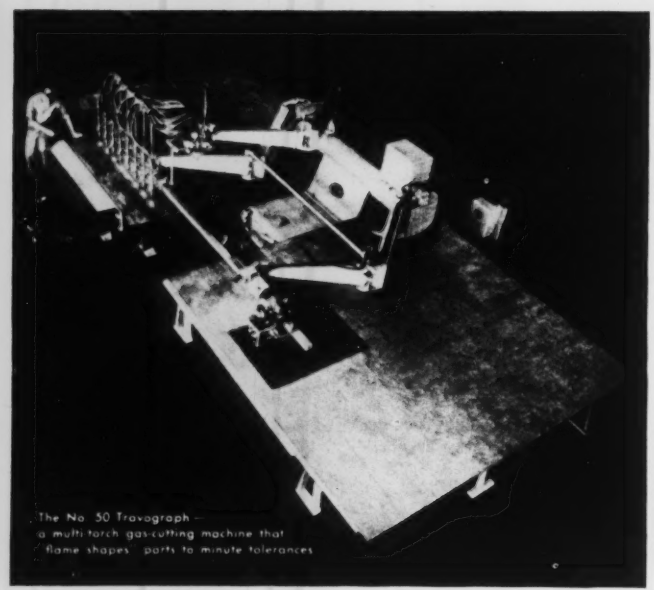

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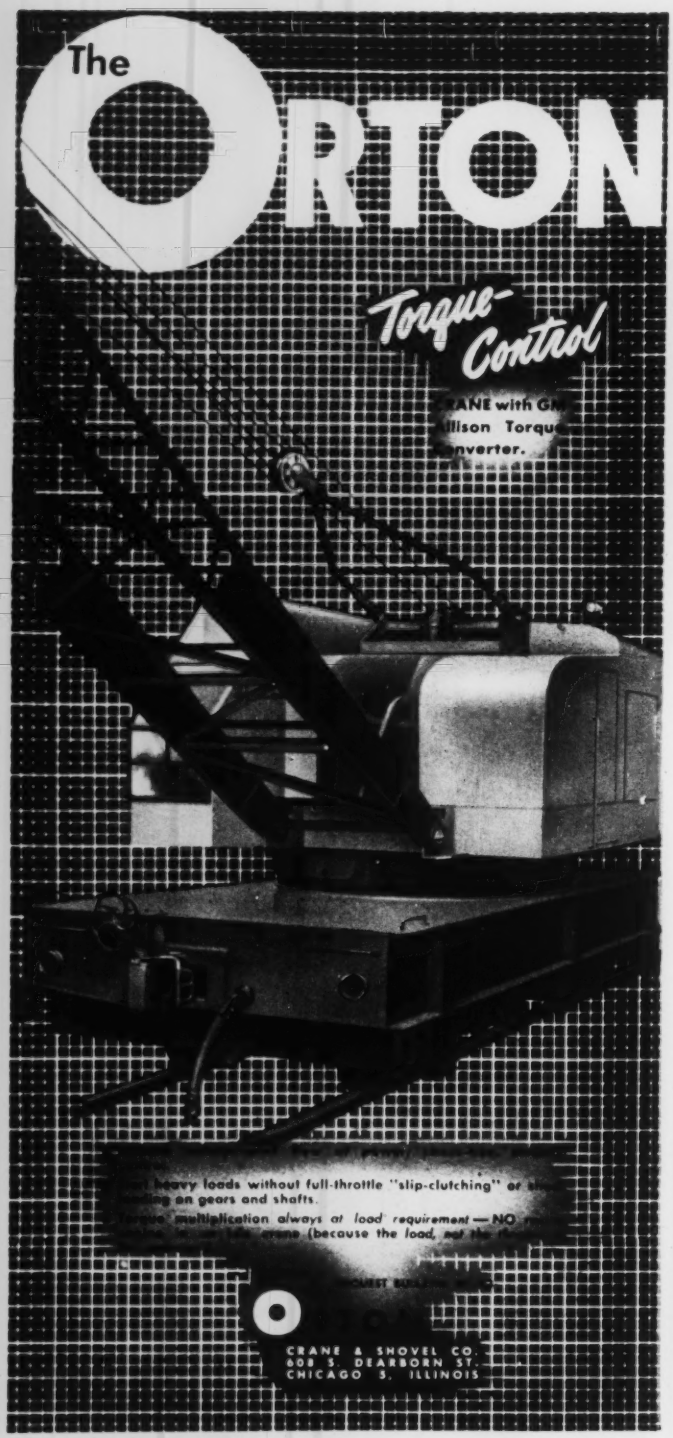

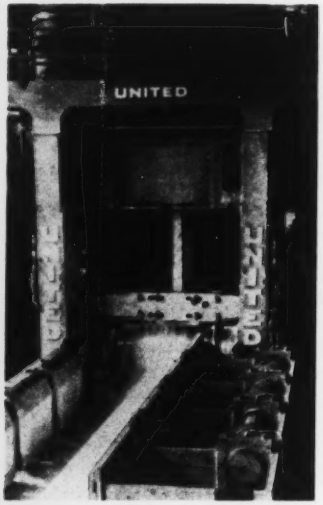

Runoff end of a blooming mill showing fittings and piping for Farval lubricating system in rugged location

longer period of settling. The temperature at which oil in the operating tank is kept will depend on the cooler capacity because it is essential that the oil returning to the bearings be maintained at 100 to 105° F as usually recommended by the bearing manufacturers.

In addition to the above methods of cleaning up oil-water emulsions, other mechanical methods are also being investigated and it is possible that much speedier and more efficient procedure will be developed.

Circulating oils (1500 to 2500 SSU at 100° F) used for lubrication of backup roll bearings of cold strip mills also get contaminated with water and mill scale but to a lesser extent than in hot strip mills, due to the fact that water for high pressure descaling is not used. The problem of separating water and scale from the oil is usually handled in the same manner as listed under the preceding discussion on contamination of hot strip mill bearing oil systems.

Sticky Bearings—Cold reduction mills and temper mills having oil film type backup roll bearings are often very difficult to start after a shut-down because of sticking of the backup roll neck bearings. These plain bearings are usually

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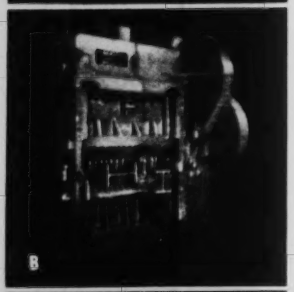

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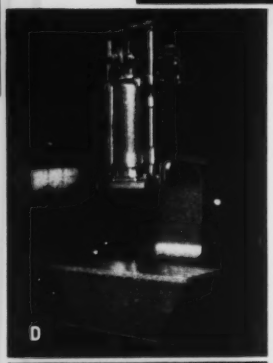

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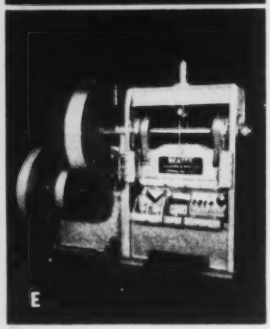

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lubricated with straight mineral oils having a viscosity of 1500 to 2500 SSU at 100° F. Sticking is usually caused by oil being entirely squeezed away from the bearing surface while in static condition and the bearing is under such a heavy load that metal to metal contact takes place.

Power applied through work rolls is transmitted to the backup rolls by friction and when the backup rolls are stuck the slippage of the work rolls often wears a flat place on the backup rolls. This makes it necessary to regrind these rolls. Sticking also often results in wiped bearings. When such failure occurs relining of bearings is a costly operation.

Beating the Game—Many mills have eliminated this type of difficulty by using circulating oils containing oiliness or EP additives, or both. The additives provide sufficient lubrication under boundary conditions to enable mills to start easily. The number of bearing failures and flattened rolls are thereby reduced to a minimum.

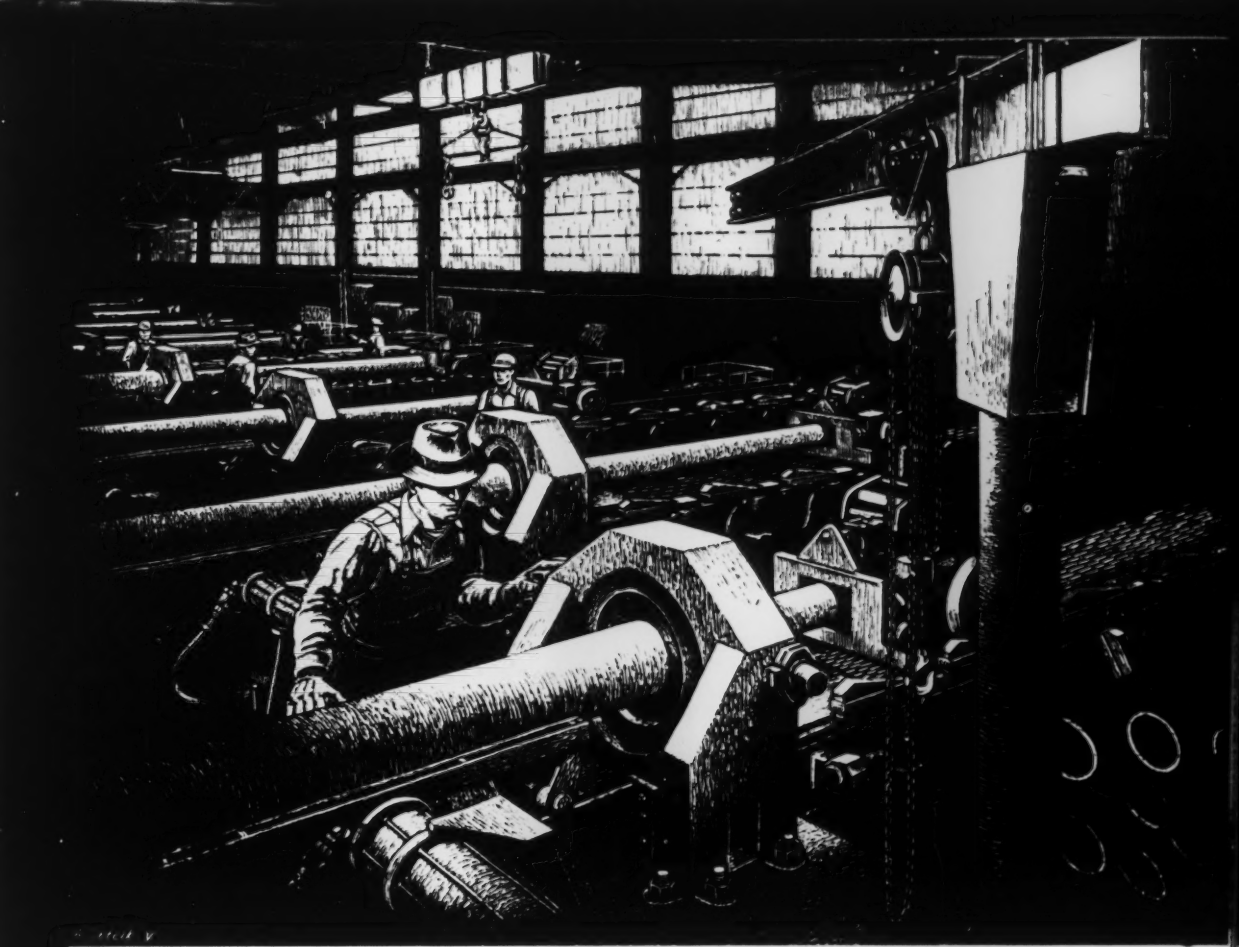
Bearing manufacturers are not in accord with the use of additives that might in any way interfere with rapid separation of water from the circulating oil. For this reason many desirable additives cannot be used because they have an adverse effect on the demulsibility of the oil. There are, however, a few additives, which from the standpoint of laboratory and plant operation tests, have no adverse effect on water separation.

Reduction gear sets are usually lubricated with mild type EP gear lubricants having viscosities at 210° F ranging from 50 to 1000 seconds. These lubricants are highly resistant to oxidation and are designed to withstand heavy duty operation.

Gear sets are usually lubricated by several methods such as:

1. Dipping of the teeth into a sump containing lubricant.
2. Gear lubricant sprayed on at the point of meshing.
3. Cut-back type leaded EP lubricants sprayed on to the gear teeth.

Another Problem — Excessive wear of gears and pinions in enclosed reduction gear sets is often



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Many manufacturers find that Pittsburgh Seamless Cold Drawn Mechanical Tubing has the uniform physical qualities, size accuracy, and fine surface finish that makes it easy to machine—saves production time, cuts costs, and improves product performance. Also important to defense and civilian needs are other Pittsburgh Steel tube specialties for power plants, boilers, condensers, and refinery stills.

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Program of Progress

Acquisition of Thomas Steel Company	100% Complete
Installation of new 66-inch High Lift Blooming-Slabbing Mill	100% Complete
Increase of Blast Furnace Capacity by 12% Per Year	60% Complete
Increase of Open-Hearth Capacity by 50% Per Year	50% Complete
Installation of Continuous 66-inch Hot Rolled Sheet-Strip Mill	70% Complete
Installation of 66-inch Cold Rolled Sheet-Strip Mill	50% Complete

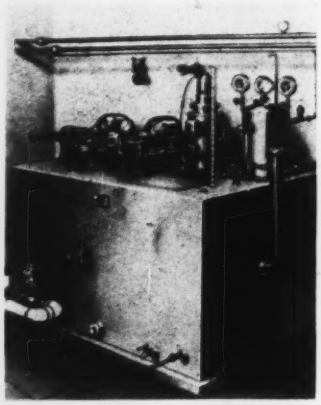
Pittsburgh Steel Company

Pittsburgh, Pennsylvania

encountered in steel mill rolling operations. This is particularly true in equipment which is being operated at heavier loads and higher speeds than those for which it was originally designed. Sometimes the gears are badly worn and gouged while at other times the teeth have deeply pitted and flaked out areas.

When difficulty of this kind is encountered the following steps should be taken: Check for misalignment of gears themselves and check for worn bearings which may be causing misalignment. Check gear metal for proper hardness. Excessive wear is often due to use of gear metal softer than specified. Incidentally, in some mills hardened pinions are used in gear reduction sets. Use lead soap EP gear lubricants; they usually will minimize excessive wear. They also have a certain cushioning effect and the EP additives assist in providing smoother operation.

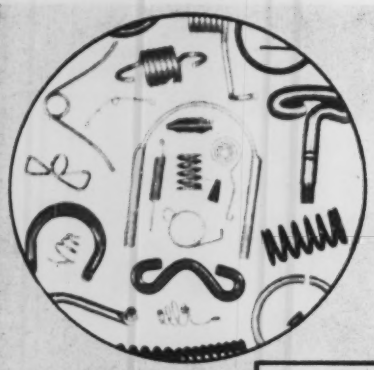
If gears are heavily overloaded, approaching the limit of metal strength, it is very difficult to overcome wear completely and it is only a matter of time before gear teeth will become worn and gouged to a point where replacement is necessary. Excessive pounding under heavy loading will also have a tendency to produce heavy pitting and flaking. EP lubricants will help to lessen this effect but cannot eliminate it entirely, since it results from metal fatigue.



Self-contained Bowser circulating oil system is compact and complete, saving on amount excavation required

Rugged Service—Enclosed type gears on front and back tables of plate and blooming mills have always presented a very discouraging lubrication problem due to the contamination of the gear lubricant with water and mill scale which are forced into the gear housing by high pressure descaling sprays usually mounted on the roll stand. Old mills which provided only bath lubrication for the table roller miter gears required a 1500 to 1800 SSU at 100° F viscosity oil. As water filled the gear housing it floated out much of the lubricant and completely emulsified the remainder. Mill scale mixing with the emulsified oil produced a most effective lapping compound playing havoc with the gears.

Some of the early oil circulating systems installed for the tables also lubricated the screwdown drives of the roll stands and other equipment thus making it necessary to use the same high viscosity lubricant on the table gears as was required for the screwdown



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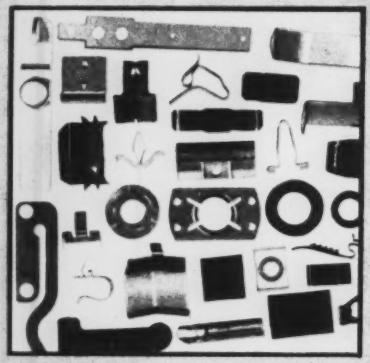

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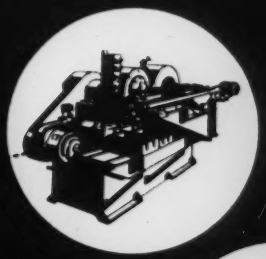
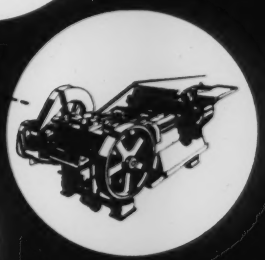
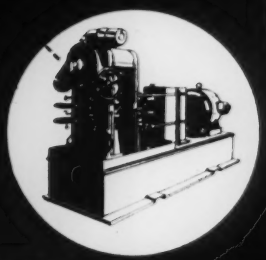
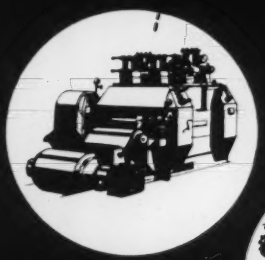
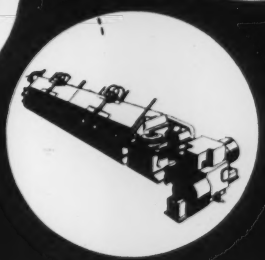










Within These Basic WF Equipment Lines, Individual Machines Are Custom-Engineered For Specific Applications

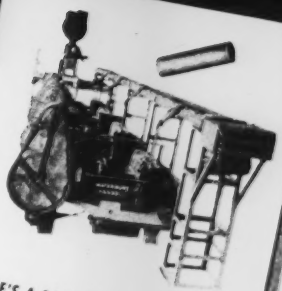
If your metal-working machinery problem falls into any of these five groups, there are good reasons for looking to Waterbury Farrel for the answer.

There's Waterbury Farrel's continuing engineering research with more than a century of machine building experience to draw upon. This results in soundly designed and thoroughly tested features which improve production.

There's Waterbury Farrel's world-wide reputation for rugged, long-lasting construction. This gives you the assurance that WF machines are built to provide long years of uninterrupted production.

Waterbury Farrel can custom-engineer special equipment or adapt a standard machine to fit your specific problem.

For further information, write for free booklets on any of the machines mentioned on this page or contact your nearest WF office.



HERE'S A SAMPLE of Waterbury-Farrel mass production equipment in action. This complete WF automatic production unit combines a 40-ton double-acting, upright blanking and cupping press, a conveyor feed and four 7-station horizontal drawing presses to draw 340 zinc shells per minute.

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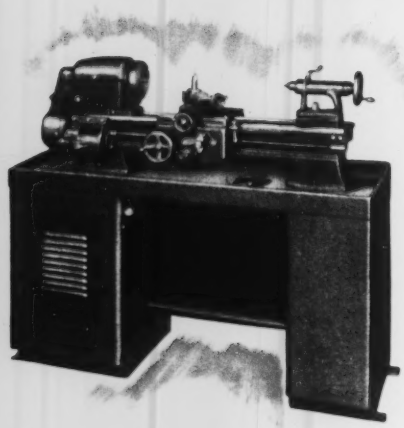

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drives. This exposed all equipment to the water and mill scale taken into the table gear housing so it was soon necessary to install a separate system for the table gears. Since the oil basement was not designed to accommodate another oil system, the one provided was usually a make-shift affair entirely inadequate for the job—consisting chiefly of a small single compartment settling tank and a circulating pump.

Later systems provided an oil inlet at one end of the table housing with the oil outlet at the other end but high enough to permit the gears to dip in a bath of oil. When water and mill scale filled the gear housing to the outlet level the incoming oil flowed through the housing on top of a bath of water providing very little lubrication for the gears which dipped into water and mill scale.

Best Answers—Following steps are found to be effective in solving these difficulties:

Install spray pipes to flood each set of miter gears continuously with extreme pressure lubricant having an approximate viscosity of 750 seconds at 100° F.

Place the oil outlet in the bottom of the gear housing to enable the water and mill scale to be flushed into a two compartment settling tank of adequate size.

Make the following changes and adjustments on the settling tank: Equip each compartment of the tank with two baffles to reduce the velocity of the oil through the tank and thus permit better settling. Attach a removable fine mesh basket strainer to the oil return line entering the settling tank. This will remove large quantities of mill scale. Install a magnetic filter to remove fine mill scale which usually passes through the pressure filter. Install steam coils in the settling tank at a steep angle to allow more uniform heating of the oil and to permit easier cleaning of the tank.

Here's How—Follow the procedure outlined below for operating the settling tank: Alternate the compartments of the settling tank every ten days or two weeks. During batch treatment of the oil a temperature of 170 to 180° F is

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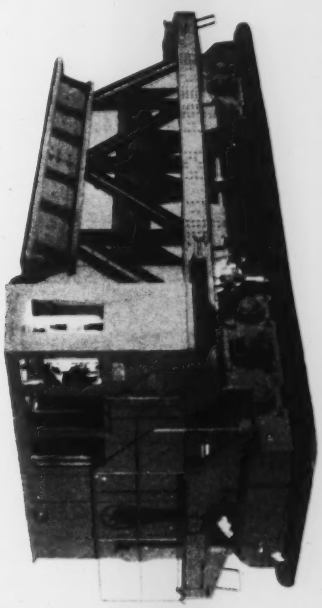
At this plant the car must cross over to the coke track to shift coke cars. There is no conductor rail on the coke track so the car is equipped with a motor-driven cable reel attachment, enabling it to perform this switching function. When operating on the cable reel the collector shoes are cut out and automatically raised off of the conductor rails. The cab is overhung to give the operator a line of vision down the side of the car.



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Survey Shows Noise Cuts Down Production

NEW YORK—A survey by a machine company found that noise cuts down production. After cutting its shop noise 35 per cent, the firm discovered production had risen 7.2 per cent. It also was discovered that noise fatigue caused 12 per cent of the absenteeism.

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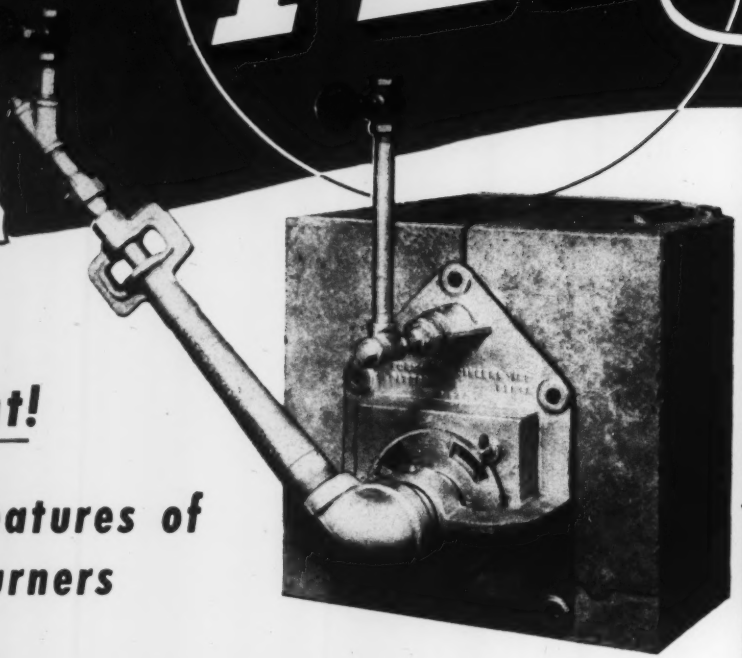

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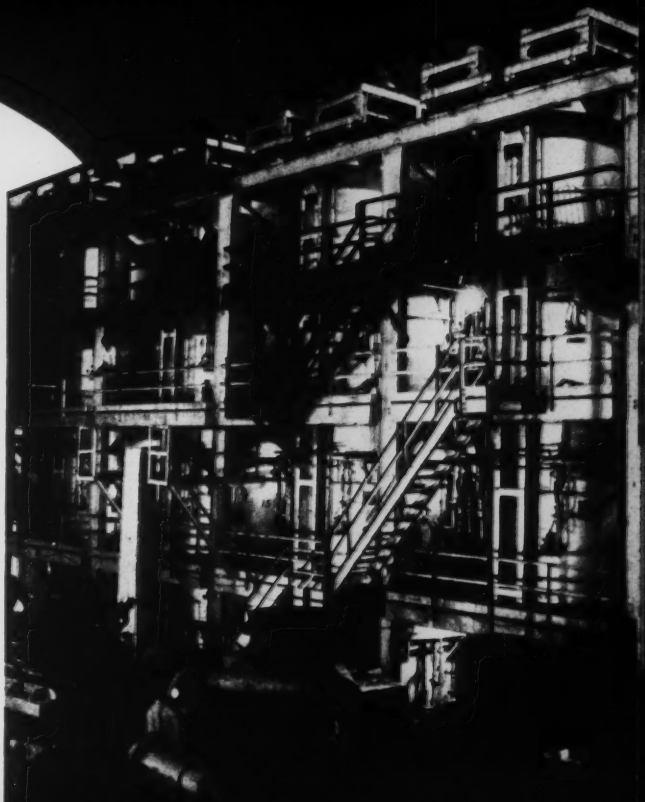

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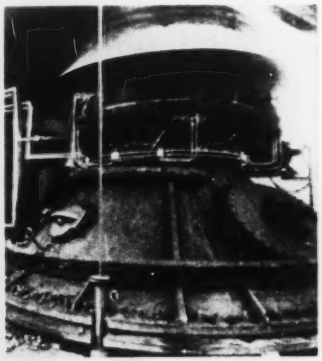

Hazards of exposure to blast furnace gases have prompted installation of centralized grease lubrication at top

usually sufficient to break normal emulsions. For breaking stubborn emulsions it may be necessary to heat the oil to 200° F. Agitate the oil thoroughly while heat is being applied to reduce localized hot spots which would promote oxidation. Agitation may be accomplished by use of mechanical stirrers or by blowing with compressed air at temperature below 150° F.

There is always the possibility of excessive oxidation when air is blown through oil at high temperatures. Cool dry air passing through warm oil partially dehydrates the oil and helps to break up emulsions due to the ability of warm air to hold more moisture than cold air.

When air agitation is used the saturated air passes out through the manholes or it may be discharged outside of the oil basement by means of fog fans or small suction blowers mounted on top of the setting tank.

Favorable Balance—Those who use air for agitation feel that more damage is done to the oil by localized heating than by the use of air for the short time required to bring the oil up to a proper temperature for batch treatment. They feel that the advantages of air agitation more than offset the disadvantages.

Open type table gears are usually lubricated at suitable intervals with heavy adhesive petroleum products. Water and mill scale contamination do not present too great a problem since there is no gear

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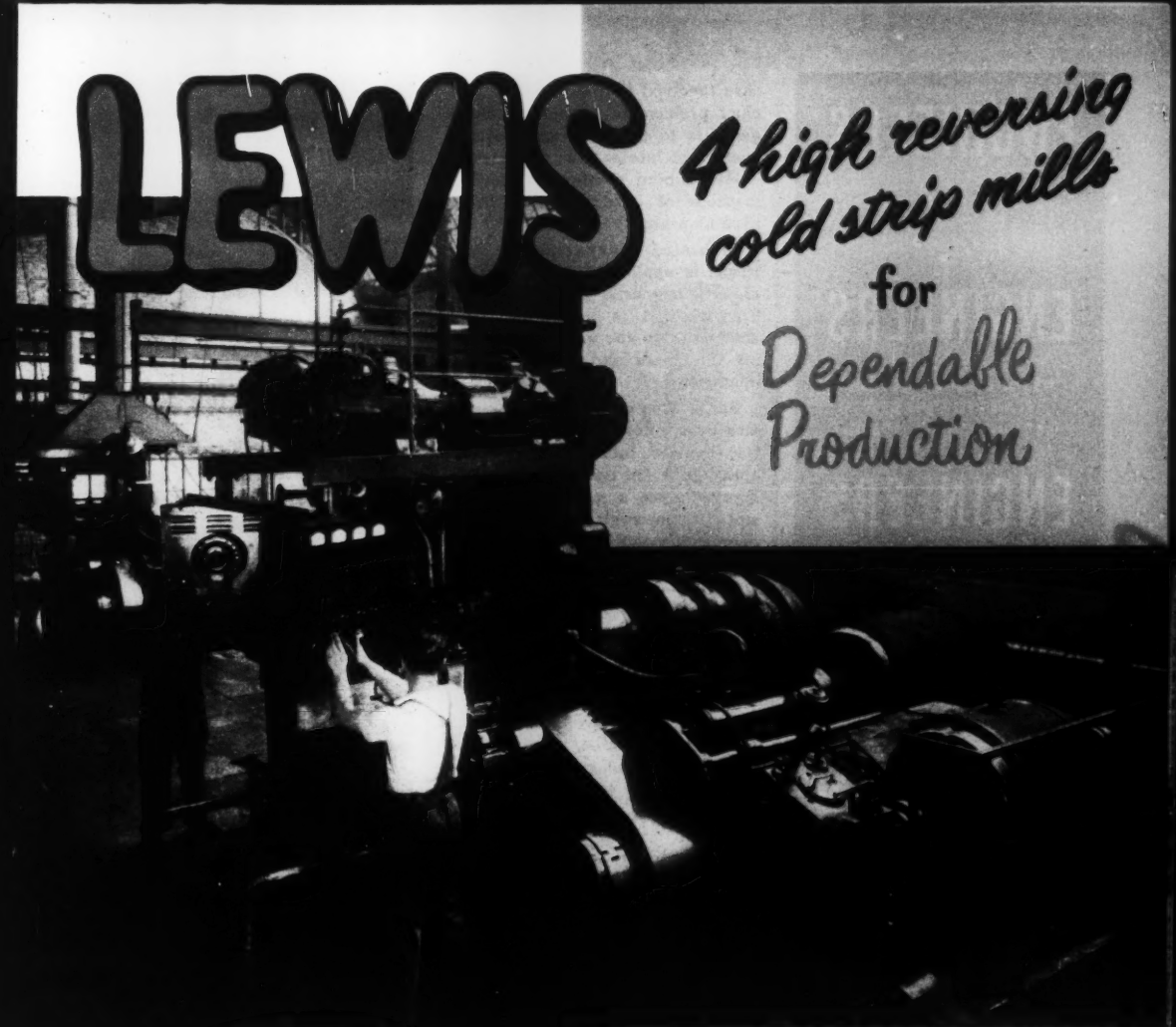
4 high reversing cold strip mills for Dependable Production



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INQUIRIES PROMPTLY ANSWERED

case involved to retain them. The chief problem in lubricating these gears is to maintain an adequate coating of lubricant at all times.

Maintaining Coating—Following methods of lubrication are being used at present:

Preheated heavy adhesive lubricant is applied to gears by paddle or it is poured on with a dipper. This method is not satisfactory since most of the grease is thrown off the gears and wasted during operation.

Spray type lubricants containing diluent are now replacing many of the heavier lubricants. Portable spray guns are used and gears are sprayed once a shift or at other suitable intervals depending on operating conditions. Spray type products, in spite of higher initial cost, are more economical than the heavy type lubricant because there is no waste in application and no throwing off in operation.

Main mill screws and screw nuts on mills with a great amount of screw travel, such as in blooming mills and slab mills, wear out fast if not lubricated frequently. Fine mill dust in the atmosphere collects on the screws and acts as an abrasive. Conventional practice on older type mills is to lubricate by pouring a high viscosity cylinder oil around the top of the screw and let it work its way down the threads.

Newer Technique—More recent practice is to lubricate the screws by a feed line off the circulating system which is used to lubricate the screwdown drives. A high viscosity lead soap EP gear type lubricant is usually used, having a viscosity at 210° F of around 400-500 SSU. A measured quantity is applied to screws and splines at frequent intervals. This type of lubrication results in a cleaner condition around the mill, lower consumption due to less oil waste and much longer screw and nut life. In some mills the screws are covered with a telescopic type of shield to keep out dust.

Grease lubricated plain roll neck bearings usually operate under high pressures and are exposed to bad water conditions. The old method of lubrication was by hand packing the bearings with a semi-

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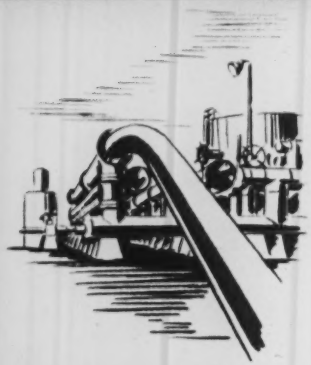

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MATERIALS handling box measures 60 by 42 by 30 inches and weighs only 245 pounds. Normal box that size weighs over 600 pounds. All-aluminum construction puts the new box in the flyweight division. It's of welded construction, using 61S alloy sheet and extrusions.

Five hundred of these boxes are in use at Aluminum Co. of America's Cleveland plants. They serve a dual purpose, handling finished products or scrap. Mounted on low runners, they may be lifted by fork trucks and carried, stacked, or turned over and the contents dumped. Tiering lugs make stacking an easy matter.

Being of aluminum the boxes, made by Powell Pressed Steel Co., Hubbard, O., resist corrosion and corrosive fumes.

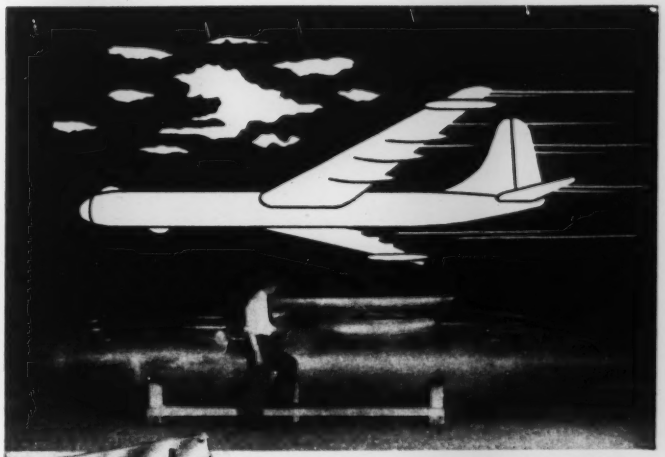
solid consistency grease. In order to lubricate these bearings properly the grease must adhere well to wet roll necks and resist being washed off by water. These bearings often have short bearing life due to this inadequate method of lubrication.

Many mills are being equipped with pressure systems which utilize a soft grease which is easily pumpable. Grease is supplied through a groove in the bearing and a small amount is pumped in at frequent intervals.

Best Choice—Some operators recommend graphited greases, since graphite seems to fill in the rough surfaces and also repels water; it thus prolongs bearing life. The use of this type of grease, however, has a disadvantage because the graphite has a tendency to wear out metering valves on the lubricating systems. Poor metering valve life appears to be the lesser of two evils.

Lubrication of the bronze slipper in universal spindle couplings on rolling mill equipment has always presented a difficult problem chiefly because when spindles need lubrication they are in motion and centrifugal force has a tendency to throw off the lubricant. The bronze slippers wear excessively and have to be replaced often if not sufficiently lubricated.

Incomplete Solution—This prob-

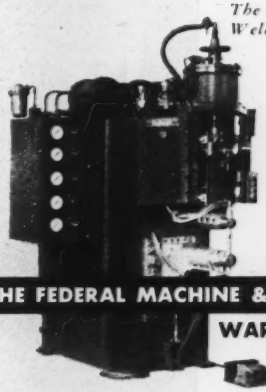


Federal RESISTANCE WELDERS USED IN CONSTRUCTION OF LARGEST KNOWN FUEL TANK

The huge external aircraft fuel tank pictured above is one of a type being produced for the Air Forces by the Ryan Aeronautical Company. Designed by Ryan the tanks are fabricated of aluminum alloys, seam welded to MIL-W-6860 (AN-W-30) on Federal Welders where Ryan is making gas-tight seams without the use of sealing compounds.

Federal Resistance Welding equipment enables Ryan to produce a smoothly streamlined tank that has no external riveting or protuberances to disturb the aerodynamic flow over the skin. Too, resistance welding the tanks eliminates added weight.

High production is another important factor and Ryan, like other aircraft and automotive manufacturers, finds Federal Resistance Welders the most efficient method for producing quality assemblies at high speeds.



The latest Federal Three-Phase Aircraft Spot Welder for welding stainless, aluminum, nickel alloys and carbon steels. If you are interested in Three-Phase Resistance Welding be sure to talk with the Federal Representative in your area. There's a reason why Federal is First in Resistance Welding. Send for your copy of the latest Federal Three-Phase Bulletin.

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Warco PRESSES®

HOOVER HONED RACEWAY

The Distinguished User list of **HOOVER,** *America's only* **BALL BEARING** *with Honed Raceways reads like a* **"WHO'S WHO** *of American Industry"* *

Write for a representative list of distinguished users of Hoover Ball Bearings

90% LONGER LIFE
30% GREATER LOAD
AMAZING QUIETNESS

The Aristocrat of Bearings

HOOVER BALL AND BEARING CO.
ANN ARBOR, MICHIGAN

lem has never been completely solved but the following partly satisfactory methods are being used at the present time:

Adhesive types of EP lubricants are applied during the time of shutdown. These have less tendency than straight mineral oils to throw off during operation. Adhesive type greases of No. 0 or 1 consistency are applied through pressure fittings at shutdown periods.

On some high speed mills cylinder oils are dripped continuously on the spindles during operation. This is not too efficient since most of the oil is thrown off before it gets a chance to lubricate.

On certain slower speed mills a chain type oiler has been quite successful using a fairly light oil as lubricant.

Recently a new type of enclosed spindle coupling has been put on the market. It is equipped for "automatic built in" lubrication using a No. 0 grade of EP grease.

Hazardous Work—Lubrication of bell and distributor systems on blast furnace tops has always been a difficult problem because it is necessary for operators to climb up to the top of the furnace and apply grease from a hand pressure gun. This could be somewhat hazardous because of poisonous gases coming from the stack.

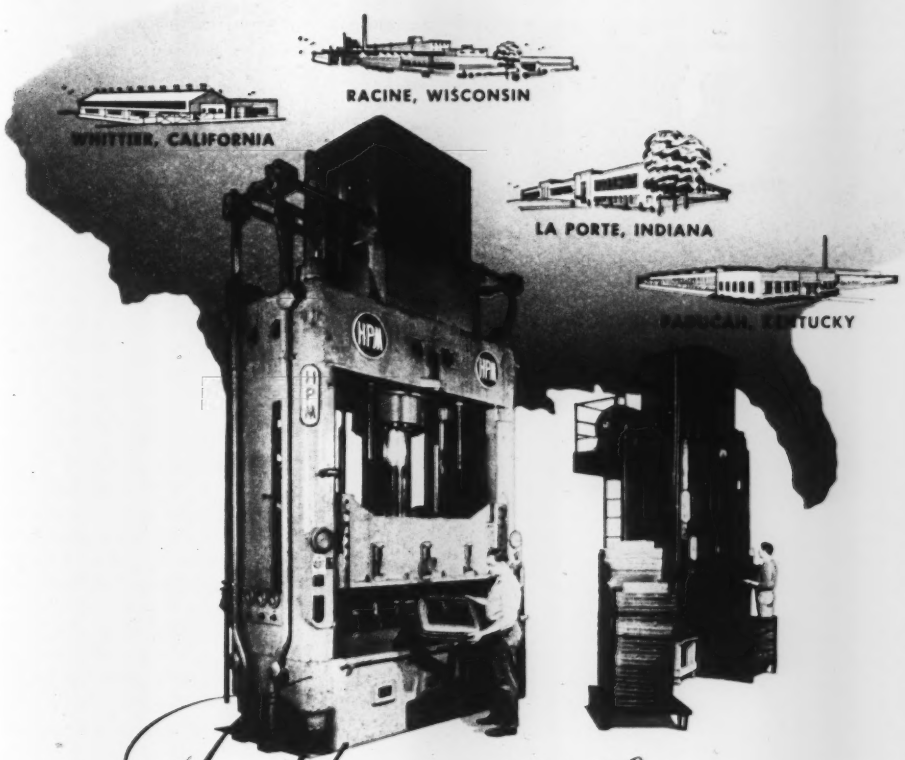
New type blast furnaces are now equipped with automatic greasing systems. A grease pump is usually located in the hoist room and grease is piped to the lubrication points at the top of the furnace.

Copper Welding Specs Issued

Latest specifications for filler metal, covering copper and copper-alloy welding rods for use with oxyacetylene, carbon arc and inert-gas metal-arc welding, have been issued jointly by the AWS and ASTM.

The 12 classifications established by these specifications include copper, silicon bronze, phosphor bronze, copper-nickel, naval brass, manganese bronze, low-fuming bronze, nickel bronze and aluminum bronze welding rods.

Copies of "Specifications for Copper and Copper-Alloy Welding Rods" are obtainable at 40 cents each from either AWS or ASTM.



Performance

PROVEN IN MODINE PLANTS COAST-TO-COAST... H-P-M's

Modine, one of America's leading manufacturers of heat transfer equipment, is another long-time user of H-P-M All-Hydraulic Fastraverse Presses. Yes, you'll find H-P-Ms at work in every one of the up-to-the-minute Modine plants . . . presses ranging from 100 to 500 tons . . . handling a multitude of sheet metal drawing operations. Men at Modine will tell you that for many years H-P-M presses have been playing an important part in their operation—stepping up production...cutting costs...and maintaining rigid standards of quality. H-P-M is proud of this long association and doubly proud of the fact that the outstanding performance of H-P-M presses on a wide variety of jobs has warranted installations in all Modine plants.

Whatever your machine or production problem, you'll benefit by H-P-M's 75 years of specialized experience in the field of hydraulics. Invite us in at the planning stage, won't you?

THE HYDRAULIC PRESS MFG. COMPANY

1044 MARION ROAD — MOUNT GILEAD, OHIO, U.S.A.

Builders of Presses for the Metal Working & Processing Industries • Plastics Molding Presses • Die Casting Machines • Hydraulic Pumps, Valves & Power Units

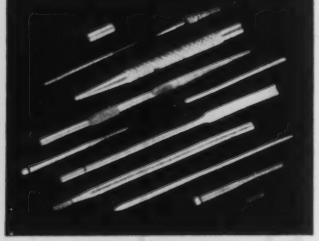
"Joe, who can make these small parts to our close 'specs'?"

"Torrington can, Tom. They have the experience and equipment to maintain precision tolerances on any quantity of small metal parts."

Small precision parts often take more production time than can be spared. That's why many leading manufacturers have turned over their parts problems to Torrington. Using the latest automatic and semi automatic equipment, our Specialty Department produces hundreds of thousands of parts every day to the exacting specifications of hundreds of customers. These companies—some of them Torrington customers for over 40 years—have learned that they save both time and money when their small metal components are made by Torrington.

Why not send us a blueprint or sample of *your* small parts? We will quickly tell you how little it costs to have uniformly accurate components.

Typical Torrington-Made Parts



THE TORRINGTON COMPANY
Specialty Department
556 Field Street • Torrington, Conn.
Makers of
TORRINGTON NEEDLE BEARINGS

Materials Life-Line

Continental Gin's 15-odd buildings pose a peculiar handling problem. Trucks solve it

TWICE the job in about half the time!

That's the estimate placed on the import of mechanized materials handling at its Prattsville, Ala., plant by Continental Gin Machinery Co.

The company's handling problem is a need for tying together 15 principal buildings and assorted smaller structures of varying ages, some dating back to 1845. Out of this plant come new gin models and replacement parts, plus a sideline of centrifugal fans. The nature of its work makes the company a combination standard production firm, jobbing foundry and machine shop.

DRIVER-LED TRUCKS
. . . tie down the entire operation

Necessary Ties — Because the many buildings range from one to four stories, they are served by elevators and bridges at various corresponding floor levels. Production and in-process storage areas are arranged for the convenience of the departments involved and a central product storage area for shipping purposes is provided whenever possible.

To tie down the entire operation, Continental uses driver-led trucks. Routes traversed lace indoor production and storage areas, the outdoor loading dock and plant yards. The trucks move to stations over

the smith had the right idea

When it comes to forming metals, there's no substitute for the hammer. No other method gives metal equal toughness and resiliency.

The Torrington Swager operates on the same principle—delivering 4000 hammer blows a minute. It reduces, tapers and points rod, wire and tubing accurately and economically . . . using every ounce of stock.

Our booklet, "The Torrington Swaging Machine," gives full details on swaging and our complete line of machines. A free copy is yours for the asking.

THE TORRINGTON COMPANY
Swager Department
556 Field Street • Torrington, Conn.
Makers of
TORRINGTON NEEDLE BEARINGS

concrete runways and sidewalks built between buildings.

Battery-Powered Mainstay—The company's need for mechanized handling was pointed up during World War II when manpower disappeared. It selected then as its mainstay the platform model Transporter, a battery-powered truck made by Automatic Transportation Co., Chicago. Still in use, the fleet consists now of eight units, including one of the newer 101 series.

Continental estimates that it handles $6\frac{1}{4}$ tons per hour with each truck. Six of the units work an 8-hour day. The other two, with spare batteries, each put in an additional 8-hour trick.

Rotors Rocked into Shape

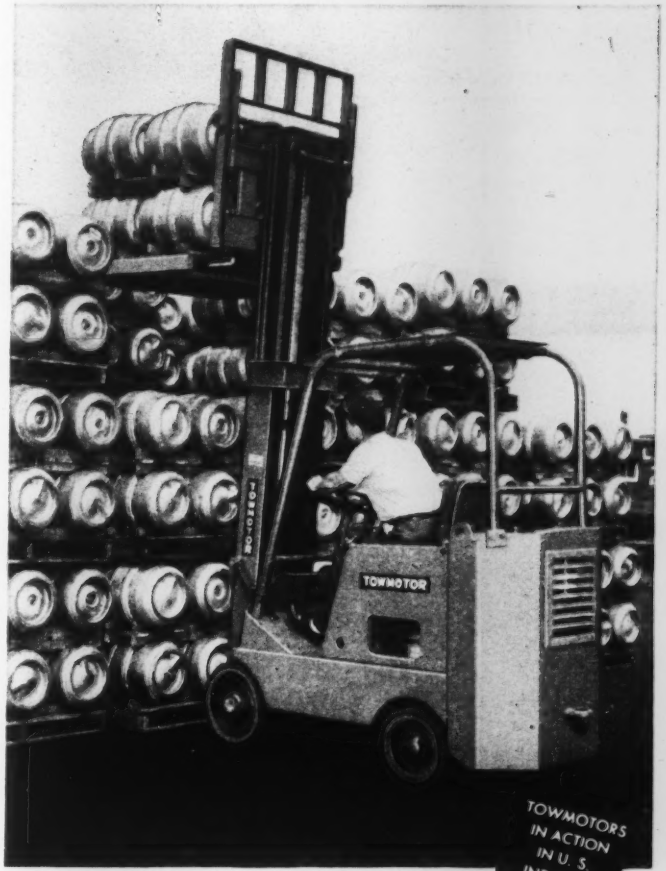
Helicopter rotors are formed by rocking rolls over the surface with a mandrel inside

ROTOR BLADES for the new Piasecki XH-16 helicopter are made of compression-formed spar tubes processed by Tube Reducing Corp., Wallington, N. J.

Extruded tubes delivered to Tube Reducing Corp. are compression-formed by their Rockrite process. Finished spar tubes, which form the backbone of the rotor blades, are then shipped to Piasecki's blade assembly plant. A honeycomb structure is mounted on the finished tube and is covered with a milled aluminum skin.

Less Machining—Since the Rockrite process actually cold forges the tube it imparts a better grain analysis to the metal, which improves the structural strength of the spar tubing. Piasecki Helicopter Corp., Morton, Pa., also reports that better control of specified dimensional tolerances, wall thickness and concentricity has reduced final machining to a minimum.

The process is a complete departure from cold-drawing in which the tubing is drawn through a die and over a mandrel. In the Rockrite process, tubing is cold sized and cold formed by rocking semi-tapered and semi-circular dies back and forth over the tubing, forcing the metal against a polished mandrel which controls the inside diameter.



TOWMOTORS IN ACTION IN U. S. INDUSTRY

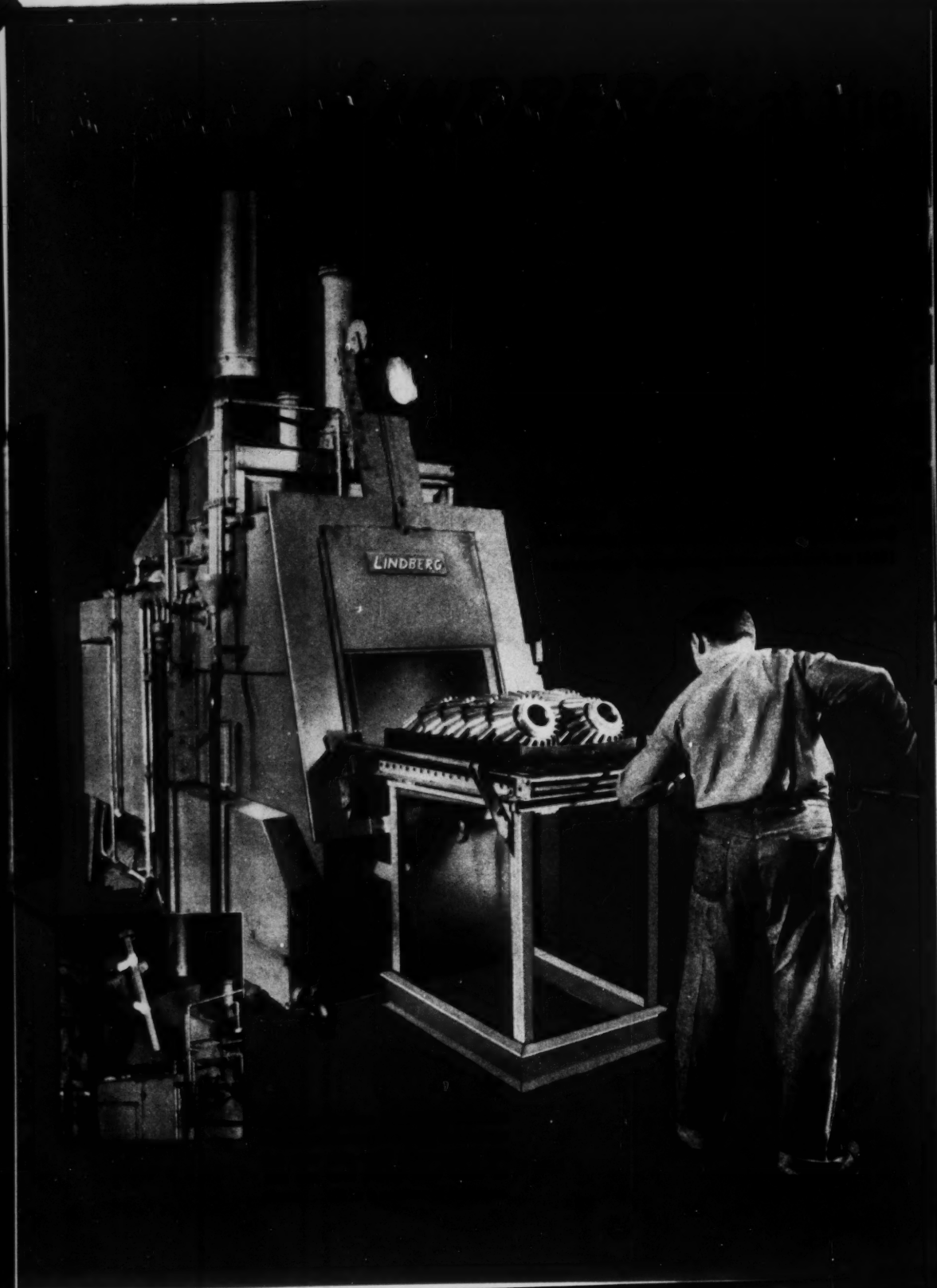
Stacking double-tier pallets of keg beer at The F. & M. Schaefer Brewing Co., Brooklyn

Lay it on the line...

multi-ton, multi-tier, palletized or otherwise . . . place load after load in exact formation with *untiring* Towmotor fork lift trucks. Towmotor teams up with 25 specialized attachments to speed "pushbutton" handling of *all* types of material. For your copy of "Man Hour Thieves," packed with timely production tips, and name of your nearest Towmotor Representative write Towmotor Corporation, Div. 16, 1226 E. 152nd St., Cleveland 10, Ohio.

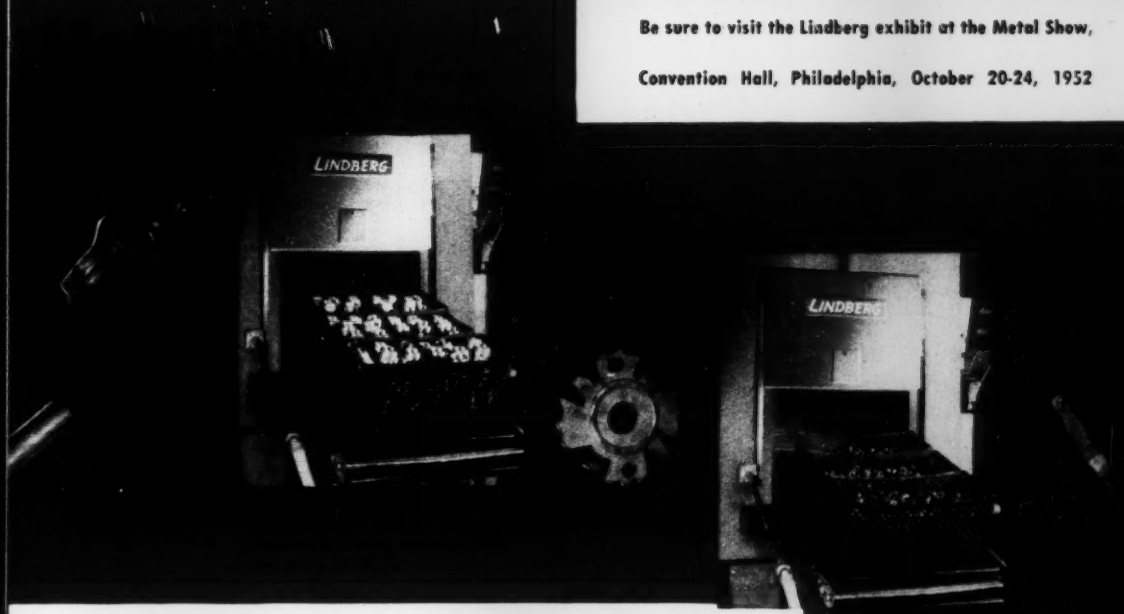
TOWMOTOR
THE ONE-MAN-GANG

FORK LIFT TRUCKS and TRACTORS
SINCE 1919
RECEIVING • PROCESSING • STORAGE • DISTRIBUTION


LINDBERG

Be sure to visit the Lindberg exhibit at the Metal Show,

Convention Hall, Philadelphia, October 20-24, 1952



Yes, you must see the new Lindberg Carbonitriding Furnace. It's many furnaces in one . . . it's easy to maintain . . . it's a self-contained unit.

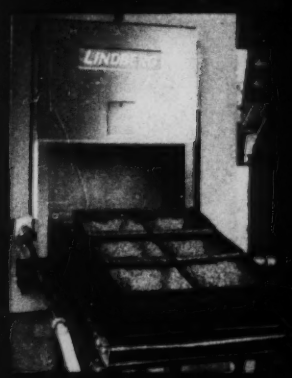
Check these important construction features . . . features that will improve production quality and volume, and reduce production costs.

Many furnaces in one . . . Furnace atmosphere is provided by the Lindberg "Hyen" endothermic atmosphere generator that is easily adjustable to supply different atmospheres not only for carbonitriding, but also for carburizing, carbon restoration, bright hardening or annealing and normalizing. For annealing and normalizing the heated charge cools in the same chamber used for purging.

Easy to maintain . . . Instead of old style, heavy, unwieldly, horizontal radiant tubes . . . new gas-fired, lightweight tubes (only 29 pounds) are used. They're simple to change . . . turn off the gas . . . get on top the furnace . . . lift out the old tube . . . hang a new one in its place . . . and the thin, rolled metal tubes actually last longer!

Quench tank pit unnecessary . . . Your Lindberg Carbonitriding Furnace is self-contained, including a built-in pitless quench tank . . . thus you avoid costly excavation and piping. But more important, this built-in quench tank minimizes distortion . . . quenching takes place within the furnace structure, by means of a vertically operated elevator. Heated charges are never exposed to the air . . . as is the case when work is transferred from the heating chamber to a separate quench tank. Uniform case depth is assured because each charge automatically remains at heat the same length of time.

Purge chamber . . . A specially designed chamber, built immediately above the quench tank and in front of the heating chamber, receives work load for purging prior to heating.



For full details ask for Bulletin 241

Forge Hammer Set Afloat

Raft-like buildup for nickel alloy forging cuts vibration, reduces maintenance

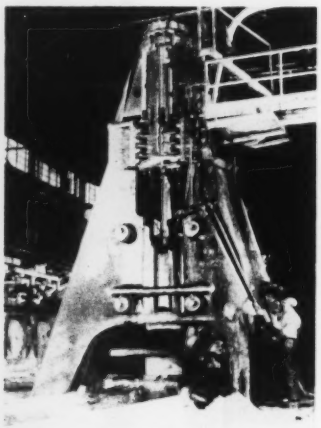
STEAM-OPERATED hammer that literally floats on a concrete raft in a concrete basin has forged its 15,000th ingot at the Huntington Works of International Nickel Co. This makes a total production to date for the hammer of 75 million pounds, according to E. M. Kline, plant manager.

Much of this production has been done in high nickel alloy forgings used for jet engine parts and other heat resistant applications. The strength and toughness of these materials are such that they pose special forging problems not common in the production of the more widely used commercial metals, says Mr. Kline.

Reduced Maintenance—The hammer reaches about three stories high, packing an overall weight of 521 tons. Its function is to convert nickel alloy ingots from the melt shop for further processing as commercial forms.

The floating construction is derived from an elaborate arrangement of springs designed to eliminate ground vibration. Its effect is reduced maintenance costs throughout the plant as well as in the forge shop.

According to International Nickel, the Huntington installation marks the first time this type of foundation has been used for a steam-forging hammer. To make it work, legs and anvil are bolted to a concrete base 21 feet long, 18 feet wide and 10 feet thick. This base rides on a rubber spring or cushion, supported by a second concrete block of similar size. Both blocks form the so-called raft that acts to float the hammer. The rubber spring is a slab of special type rubber, bonded on each side to a steel plate.



STEAM-OPERATED HAMMER
. . . floating power cuts vibration

Radical Difference—The bottom of the second—or lower—block in turn rides on 432 coil steel springs, resembling to some extent those used on railroad cars. These springs are mounted on a concrete floor supported by cement piles or pillars. Altogether, the foundation from the top of the uppermost block to the bottom of the pillars reaches 40 feet below the forge shop floor.

This construction differs radically from conventional steam hammer foundation which usually consists of a concrete pad and sever-

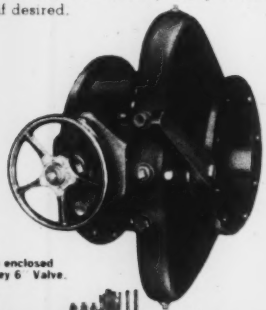
Dependable Operation under all conditions!

60" x 48" Bailey Valve for Horizontal Gas Main.

Bailey MECHANICAL GOGGLE VALVES

BAILEY Goggle Valves provide a tight, positive seal for shutting off gas mains in emergencies or for repairs. Requiring a minimum of maintenance, they operate by a powerful clamping force which is applied equally at all points around the disc periphery. Regardless of time between operations, they open or close instantly. Sizes from 6" to 72", totally enclosed if desired.

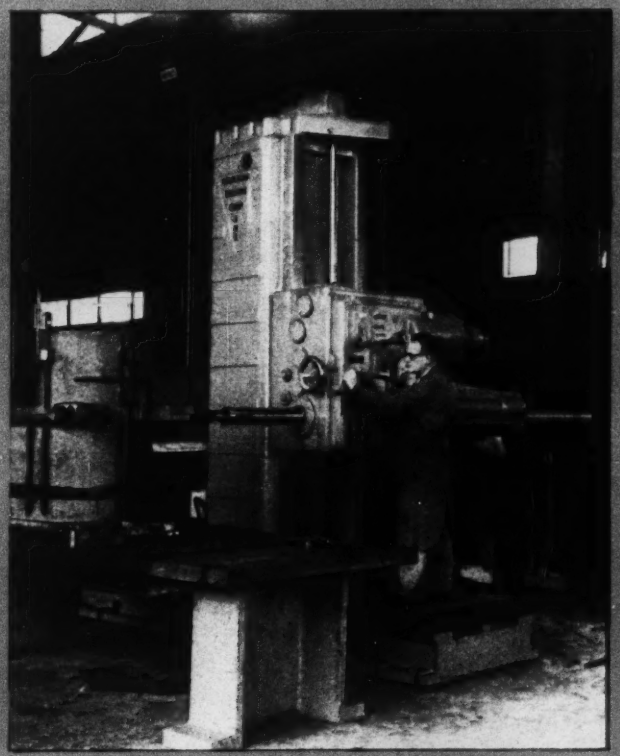
Instant Service Where It's Wanted, for—
GAS WASHERS
GAS MAINS
COKE PLANTS
BOILER PLANTS



Totally enclosed type Bailey 6" Valve.

WILLIAM M. Bailey COMPANY
ENGINEERS
LEADERSHIP THROUGH QUALITY
1221 BANKSVILLE ROAD PITTSBURGH 16, PA.

Kaukauna UNIVERSAL AND HORIZONTAL DRILLING AND TAPPING Machines



Model 3040 Horizontal Drill—machining all four sides of rail slide casting.

CUT COSTS ON SETUP TIME, CRANE TIME, FIXTURING MACHINE HOURS

. . . drive boring fixtures and perform drilling, reaming, boring, counterboring, tapping and spotfacing operations on any size or shape from small production parts to large unwieldy workpieces.

Model 3040 is a sturdy rugged horizontal drilling machine with 10 HP, 15HP or 20HP spindle motor and unusual column rigidity. Maximum productivity assured by use of highest feeds and speeds permissible with modern cutting tools.

Other horizontal models have tilting head or horizontal head and 360° column swivel. Universal models with compound head swivel permit angular, radial and horizontal machining operations with one setup. Machines designed for both portable and stationary applications. Extended runway travel and column height available on all models. Special adaptations to handle your machining problems.

WRITE FOR CATALOG

Model 125-U Universal Drill—drilling, tapping and doweling rocks in place on boring machine runway.

Model 125-HR Horizontal Drill—used with revolving table to drill and tap tractor frames.

Model 1030 Horizontal Drill—performing drilling, tapping and boring operations on milling machine column.

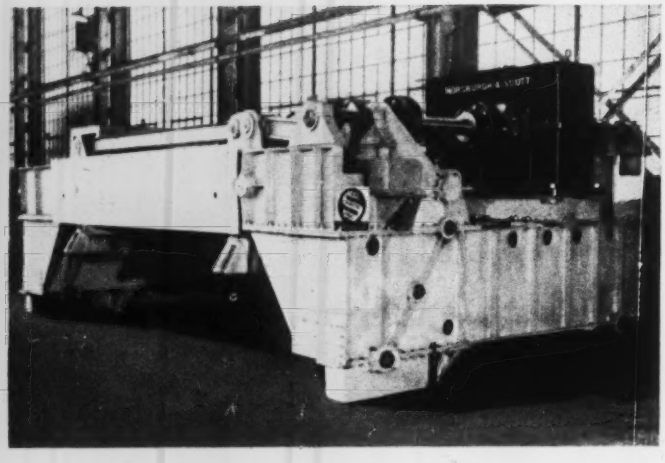
Special Model 140-U with extended column, runway, and reach—for drilling Diesel engine bases and blocks.

KMC

Kaukauna MACHINE CORPORATION

KAUKAUNA, WISCONSIN, U. S. A.

Giving a lift to 56,000 pounds of



soaking pit cover through . . .

H & S REDUCERS

● The above photograph shows a soaking pit cover crane designed and built by Salem Engineering Company. Two Horsburgh & Scott Helical Speed Reducers are used on each crane...the lift drive handles a cover weighing about 28 tons and operates at a speed of 6' per minute... the traverse drive moves the crane at a speed of 88' per minute. Many of these cranes have been operating very satisfactorily for twelve to fifteen years... actual tribute to complete engineering design.

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 HAMILTON AVE. • CLEVELAND 14, OHIO, U.S.A.

Send note on Company Letterhead for Speed Reducer Catalog 46

al tiers of lumber 12 inches square. Vibration from the old foundation could be felt throughout the 90-acre plant, the company reports. Its effect was marked on other equipment in the hammer shop and in all adjacent buildings, adding considerably to maintenance expense.

Plastic Water Pipe Tested

Gaining public health approval of extruded plastic pipe for water systems is the goal of a research project undertaken by Society of the Plastics Industry Inc., at the National Sanitation Foundation, University of Michigan.

Main objectives of the program are a demonstration of nontoxicity and proof that plastic materials do not impart odor and taste to water. Materials to be tested in the two year project are polyethylene, polystyrene, celluloseacetate, butyrate and copolymers of polyvinyl chloride.

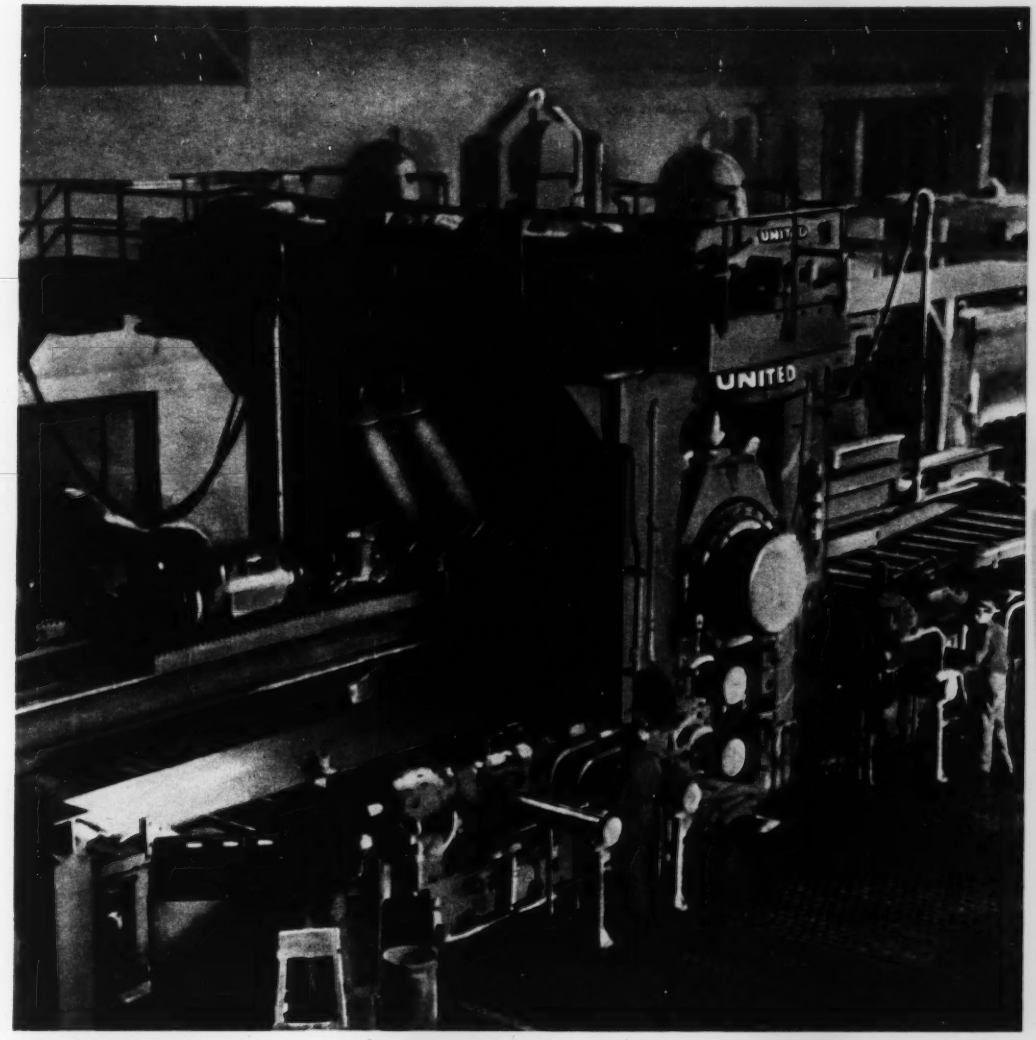
At the project's conclusion, comprehensive reports of the findings will be widely disseminated to public health officials, colleges, and universities throughout the country.

Better Cushioning for Boxcars

Western Pacific Railroad Co. officials are watching with great interest the road testing of two experimental rubber cushion underframe PS-1 boxcars. The cars were delivered recently from Pullman-Standard Car Mfg. Co.'s Michigan City, Ind., plant.

Laboratory tests indicate that this cushioned underframe device with sliding sill is capable of reducing breakage of fragile loadings by more than 60 per cent. Placed in special transcontinental freight service, the cars will carry lading of highly fragile nature plus special recording devices to check efficiency under actual operating conditions.

Unlike other cushioning devices now available, the rubber cushion is located in the center of the underframe sill, coupled to the car body by rubber compression pads. This gear never goes solid against metal but continues to compress the rubber. Conventional draft



4 High Aluminum Rolling Mill

What do you do when it takes hours... sometimes days... to change v-belts?

1 Put one or several maintenance men on the job

... and pay for repairs while production stands still

2 Pay overtime

... and have repair costs eat away your profits

3 Standardize on VEELOS...

... and change belts in up to 1/10th the time
... save labor, save time and save overtime
... keep machines producing for maximum profit

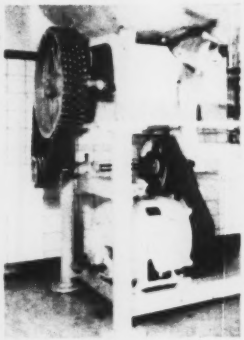
Comparison proves the value of VEELOS...

Minimum Inventory—4 reels of Veelos in the O, A, B and C widths can replace up to 316 different sizes of endless v-belts. If you use only one width of v-belt you can stock just one reel of Veelos.

Quick Installation—link construction makes it unnecessary to remove outboard bearings.

Complete Adjustability—vibrationless, full power delivery is assured because uniform tension on each belt in a matched set can be maintained.

VEELOS
THE LINK
V-BELT



VEELOS DATA BOOK

gives complete details on construction, installation and uses. We'll gladly send you a free copy of this 28-page fact-full book... write today.

MANHEIM MANUFACTURING & BELTING COMPANY
613 Manbel St., Manheim, Pa.

ADJUSTABLE TO ANY LENGTH · ADAPTABLE TO ANY DRIVE

Made in all widths in three types: regular, oil-proof, static conducting. Also in double V in O, A and B. Packaged on reels in 100-foot lengths. Sales engineers in principal cities, over 350 distributors throughout the country. VEELOS is known as VEELINK outside the United States.

Flux Holder

Taping up a seam before welding it speeds up the operation at Farrar & Trefts Inc., Buffalo. Tape is made by the Minnesota Mining & Mfg Co., St. Paul. It holds flux in place while the initial stringer bead weld is being made. Applied to the underside of seam openings, the tape burns off as soon as metal becomes hot

gears are still used at each end of the center sill.

Grinding Wheels Crush Dressed

Crush dressing of grinding wheels to establish special profile shapes will be demonstrated by Diversified Metal Products Co. at the national metal show.

The process utilizes a precision ground roll of desired profile which is crushed against and imparts its shape to the grinding wheel. Where finish is important, complicated profiles can be rough turned on screw machines and centerless ground over their entire surface at high speed. Tolerances impossible to attain by turning are claimed for the process.

Shells Coated Automatically

Automatic application of phosphate coating to shells at low cost will be a feature of the Frederic B. Stevens Inc. booth at the national metals show.

A completely automatic barrel plating and processing machine will pass 30, 45 and 50 caliber shells through various cycles of the phosphating operation, and a conveyor will return coated shells

Engineering, production and economic advantages obtainable with forgings are presented in this Reference Book on forgings. Write for a copy.

FORGINGS ARE UNUSUALLY EFFECTIVE FOR SOLVING PROBLEM PART PROBLEMS

A problem part problem, however complex, often ceases to be a problem once all the aspects of the part are checked with the unrivaled economic and mechanical advantages of closed die forgings and the closed die forging process for producing parts. Whatever the nature of problems that make a problem part, consult a forging engineer to determine the extent to which forgings can help you solve them.

DROP FORGING ASSOCIATION
605 HANNA BLDG. • CLEVELAND 15, OHIO

Please send 60-page booklet entitled "Metal Quality—How Hot Working Improves Properties of Metal", 1949 Edition.

Name .....
Position .....
Company .....
Address .....

to the loading bin where the operation will be repeated.

Other features of the Stevens exhibit will include an installation of Roto-Finish equipment and a new polishing wheel header.

Safety Code Approved

A safety code embodying provisions for safety in the use of power forging and flat-die forging was recently approved by American Standards Association, New York.

Covering all classes of power-forging machinery and incidental operations and equipment in connection with such machinery, requirements are given for working and aisle space, construction of platforms, lighting, head and foot protection, safety clothing and devices. Specific requirements are included for all types of machines and furnaces.

Copies of the code are available at the American Standards Association, 70 E. 45 St., New York 17, at $1.00 per copy.

For machine screws, wood screws, drive screws, specials, etc. These machines have automatic feed and self-lubrication. They feature accuracy, easy setup, rigidity and table-top working level. Model A-312 rolls screws from .138 through ¼" diameter with thread lengths up to 2½". Smaller model A-190 rolls from .086 through .190 inches diameter with thread length up to 1½"

When it comes to production

HARTFORD *Special*

THE HARTFORD SPECIAL MACHINERY CO., HARTFORD 12, CONN.

Checks Heat of Hot Steel

Liquid steel temperature can be read faster at less cost with electronic device

ELECTRONIC DETECTING device that will improve measurement of molten steel temperatures is announced by Minneapolis-Honeywell Regulator Co., Minneapolis.

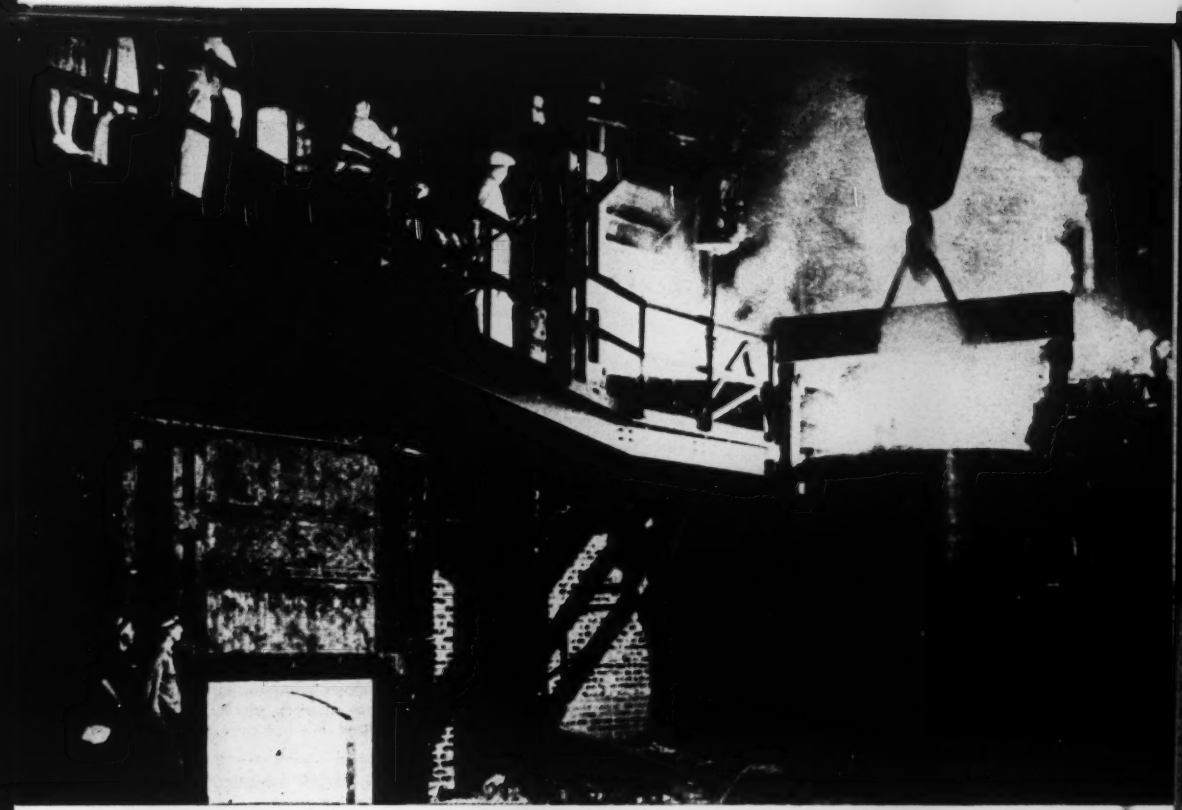
New device makes practical the use of fast-acting immersion thermocouples for measuring the liquid steel temperatures. Field tests in half a dozen steel mills show that application of the device has resulted in reductions in the cost of the temperature-taking operation as well as increases in accuracy of the reading.

Dollars to Cents—For example in one mill the cost for each temperature reading was computed at $5 per reading. Utilizing the balance detector the cost per reading dropped to 20 cents.

Called a "balance detector" the electronic instrument extends the life of immersion thermocouple assembly by as much as 100 per cent. This is done by holding to an absolute minimum the time the unit is immersed in hot steel. In addition, its increased sensitivity has speeded up the entire temperature reading operation, reducing reading time by some 75 per cent in many instances.

The High-Sign—The instrument, when immersed in the molten steel, signals the operator at the precise moment the maximum, or true reading is obtained. Previously operators had to guess at this and consequently were prone to leave the unit immersed in the steel too long. This usually resulted in disintegration of the expensive platinum thermocouple and was one of the big drawbacks for universal adoption of the immersion thermocouple technique for steel temperature measurement.

To illustrate how little margin there is for human error in this important steel production stage, the engineers explain that to measure the temperature of open hearth, low carbon steel at 2850° F, without the new electronic device, might take as long as 22 seconds.



FOR YOUR FOUNDRY ENGINEERING PROJECT—

. . . . . experienced engineers who will furnish complete engineering services for the project. They will develop designs and specifications for both equipment and structures, and obtain suppliers' and contractors' proposals from which efficient purchasing can be made. They will provide supervision, for the owner, of the construction of buildings and the installation of equipment.

GIFFELS & VALLET, INC.

INDUSTRIAL ENGINEERING DIVISION
1000 MARQUETTE BUILDING, DETROIT

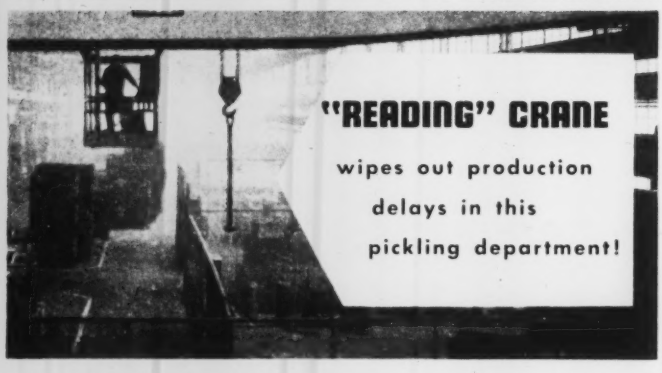
When heavy, unwieldy weldments like these diesel crankcases can be quickly swung into any position so that every weld is made *downhand*—that's efficient welding!

Welders spend more time welding—do better welding at lower cost when they work with C-F Positioners because these hand and/or power operated machines reduce positioning time to a minimum. Investigate the cost-saving advantages of C-F Positioners. They pay their way in any company.

Write for Bulletin WP26 — an illustrated circular detailing the Specific advantages of C-F Positioners.

CULLEN-FRIESTEDT CO.
1308 S. Kilbourne Ave., Chicago 23

CULLEN-FRIESTEDT CO., CHICAGO 23, ILL. C-F positioned welds mean better, more economical welds



A prominent producer of automobile frames found production slipping. Figuring it was due to inefficient load handling equipment in his pickling room, he called in a "Reading" handling engineer.

After installing a 10-ton "Reading" overhead traveling crane he found his problem solved. Now the operator simply pushes a button. The motorized crane, traveling 400 feet per minute, does all the work.

Employee morale is higher because fatigue is eliminated. And the extra efficiency obtained resulted in improved production.

Further information on "Reading" Electric Cranes will enable you to judge their advantages for your own load handling operations. Get our latest 16-page bulletin, "The *Why* and *How* of Faster Production. Write to:

Chain Hoists
Electric Hoists
Overhead
Traveling
Cranes

READING CRANE & HOIST CORP. • 2102 ADAMS STREET, READING, PA.

READING CRANES

Basket Handling System

An addition to the Nestier handling systm made by Doepke Mfg. Co. Inc., Rossmoyne, O., is steel mesh basket shaped like the firm's original materials box. The basket is built to make handling efficient and save space in work where small parts are dipped in chemicals or other liquids

But, if the operator misjudges by as much as 3 seconds, leaving the thermocouple in for 25 seconds, it will be destroyed. With the balance detector a proper reading can be obtained in precisely 10 seconds without ruining the unit.

Firms Push New Bonding Line

Processes developed from a line of materials that perform unique functions in bonding metals will be exploited through an agreement between ChemoTec Division, Eutectic Welding Alloys Corp., Flushing, N. Y. and Ciba Co. Inc., New York. The division will manufacture and market under Ciba license, using the latter's basic materials and processes.

Oven Line Acquired

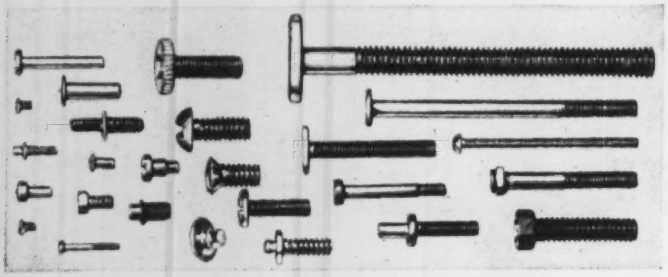
Line of DryRod electrode ovens, formerly sold by Philip Roden Co., has been acquired by Phoenix Products Co., Milwaukee. Designed to preserve mineral-coated electrodes from the damaging effects of normal shop moisture pick-up, DryRod's thermostatically - controlled electric oven employs circular design for uniform heat distribution.

ONE always stands out...
IN refractory dolomites it's...
BAKER'S MAGDOLITE
The J. E. Baker Company takes pride in announcing the completion of its new, modern plant in York, Pennsylvania. This new operation, supplementing our other plants in Eastern Pennsylvania and Ohio, will enable us to meet the increased demand for dolomite necessitated by the tremendous expansion of the steel industry. Yes, we can now assure you of the kind of dependable dolomite shipments that the people in the steel industry have needed—and to a larger area.
The superior quality of this new source of dolomite means the continuance of BAKER'S MAGDOLITE'S leadership within the industry... and guarantees top performance for you. Yes, those who know insist on BAKER'S MAGDOLITE... the original deadburned dolomite!
ALWAYS 5 WAYS BETTER — Composition • Preparation • Strength • Economy • Quality
JEBCO
PRODUCTS
SINCE 1889
THE J.E.BAKER COMPANY

BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

"Bridgeport" MILLS IN BRIDGEPORT, CONN. AND INDIANAPOLIS, IND. — IN CANADA: NORANDA COPPER AND BRASS LIMITED, MONTREAL



A variety of precision screw products made by cold heading and roll threading. Courtesy Harvey Hubbell, Inc., Bridgeport, Connecticut.

Cold Headed Fasteners For Economy and Strength

Mass production through clever, specialized machinery has brought about America's outstanding productivity rate with its resulting benefits. Making screw products from wire by cold heading and roll threading is an almost perfect example of mass production of a quality product at surprisingly low cost.

A modern, automatic two-blow cold heading machine, such as used for making the simpler items illustrated above, can turn out as many as 15,000 machine screw blanks (before threading) per hour. However, the average production per heading machine of the majority of the above items comes closer to 10,000 pieces per hour because they are more complicated than ordinary machine screws.

Higher Physical Properties

Not only is cold heading an economical method of production, because little or no scrap is generated, but increased strength, hardness and stiffness are attained in the finished article as compared with the properties of the wire from which it is made.

Furthermore, roll threading which is done on fast hopper-fed roll threading machines also hardens and strengthens the shank and raises the tensile strength from 5 to 8 thousands of pounds per square inch above that of the same section before roll threading. On the other hand, a cut thread weakens the metal since it removes a portion of the stock and cuts down the cross-sectional area.

In spite of the large displacement of metal involved in making a typical cold headed product, the brass or silicon bronze wire is not supplied in a soft temper. It is furnished in a drawn temper so that the unthreaded shank which generally receives less work unless extrusion is involved (reduced from wire with a larger diameter), will be as strong and stiff as possible.

In the case of Silicon Bronze alloy 609, the wire is supplied in the hard drawn condition since it is extremely ductile in all tempers. The finished cold headed, roll threaded product can easily attain a tensile strength in the neighborhood of 90,000 psi. This compares with an average of about 70,000 psi for low carbon steel screw products. Furthermore, alloy No. 609 has excellent resistance to corrosion and to stress corrosion cracking. Consequently, screw products made from this engineering alloy are used for outdoor construction, for all types of fasteners used in electrical transmission lines, pole line hardware, for boat construction and for fastening architectural bronzes.

Versatility and Low Cost

Although the size of the finished item depends upon the capacity of the heading machine, the variety of the head and the character of the threaded portion are limited only by the ingenuity of the tool designer. For this reason it pays to look into the possibility of using the cold heading method for fabricating small parts required in volume that are generally made by other methods. Using the cold heading process may possibly require some re designing of the piece but savings in cost obtained through using cold heading methods are generally considerable.

Metal Selection

High Brass 16 (copper approximately 65%, zinc 35%) is still the favorite metal for the making of cold headed fastenings. This is primarily because of its ease of manufacture, the excellence of the product, and the lasting utility which it imparts to the finished article. Only after working with tough metals does the operator appreciate the advantages of brass, which often permits the machine to make a million pieces before dies are worn.

Silicon Bronze 609 (copper approximately 98%, silicon 2%) is finding ever wider applications because of its unusually fine physical properties.

Close metallurgical control under laboratory supervision makes possible screw wire with definite properties – a combination of good strength and excellent malleability, uniformity, and close dimensions – essentials for high speed automatic operation. Consult the nearest Bridgeport office for your metal requirements. Write on company stationery for the Bridgeport Brass "Technical Handbook" for further information on screw wire for cold heading. (8958)

Bridgeport's newest warehouse at 918 East Lycoming Street, Philadelphia, Penna.

New Philadelphia Warehouse Marks Expanded Warehouse Program for Bridgeport

Our new Philadelphia warehouse pictured above was opened to meet the needs of the great industrial area centered around Philadelphia. This new warehouse is located at 918 East Lycoming Street and provides about 12,000 square feet of warehouse space. Users of copper and brass mill products in the Greater Philadelphia area are cordially invited to use the facilities of this new warehouse for rush orders, and to call on the services of our Philadelphia District Office for any technical assistance they require.

Bridgeport's warehouse service is an important adjunct to our mills at Bridgeport, Conn., and Indianapolis, Ind.

When you are on the spot for a small lot of brass, bronze or copper to finish a run, or for experimental or pilot-model work, your nearest Bridgeport warehouse can supply you from adequate stocks of strip, rod, wire, and tubing with a minimum of delay.

To expand the usefulness of available stocks of copper-base alloy strip material, and of customer's stocks, slitting and straightening equipment has been installed in most Bridgeport warehouses.

Write for your free copy of Bridgeport's Warehouse Stocklist. It will help you in your purchasing and provide you with a handy reference on copper-base alloy products.

Strategically Located

Bridgeport's warehouses are located where they can best serve the needs of industry. The stocks maintained at these warehouses—in Akron, Chicago, Cleveland, Denver, Los Angeles, Minneapolis, Newark, Philadelphia, Providence, St. Louis and San Francisco—are adapted to the needs of the industrial areas they serve. Our warehouse managers always appreciate your suggestions as to the items and sizes that will best serve your needs.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

Nibbler For Sheet Metal is portable, said to cut accurate curves, straight lines, inside cuts, slots. Weighing 6 lbs., the tool has a head that can be turned any direction in a 360° circle, without turning housing. Operates on AC or DC and cuts up to 14 gage metal. **No. 1256**

Surface Grinder processes metal parts without using holding fixtures. Machine uses 12-in. cylinder type grinding wheel which rotates in horizontal plane and is recessed within grinding table work surface. Parts up to 9½ in. wide can be processed. Dust removal and coolant systems are included. **No. 1257**

Angle Checking Tool for sheet metal work is said to be accurate to within 1/12 of a degree. Is said to be useful in tooling, production and inspection of sheet metal work. **No. 1258**

Portable Right-Angle Pneumatic Tool is equipped with ½-in. chuck for drilling in locations normally hard to reach. Equipped with either lever or button-type throttle valve, tool is said to operate free at 950 rpm. on 90-lb. air pressure. Tool weighs five pounds and comes with 8-ft. length of ¼-in. air hose and fittings. **No. 1259**

Infrared Oven Panels are said to be ready for erection in oven structure. Two sizes are available, 1 x 4 ft., with 10.8 kw capacity and 2 x 4 ft., with 21.6 kw capacity. Panels come with built-in bus bars and five-ply insulation. Output is said to be in excess of 9200 Btu per square foot per hour, and variable for temperatures up to 700° F. **No. 1260**

Jack For Machine Leveling is screw-operated wedge. The smaller of two sizes is said to provide ⅜-in. of vertical adjustment in 2½-in. of longitudinal movement. Larger size moves through ½-in. in 3 in. of movement. Load capacities are 3 and 5 tons, and weights of wedges are 5 and 10 lbs. **No. 1261**

BRASS, BRONZE, COPPER, DURONZE, NICKEL SILVER, CUPRO NICKEL

BRIDGEPORT BRASS

"Bridgeport"

BRIDGEPORT BRASS COMPANY, BRIDGEPORT 2, CONN. • ESTABLISHED 1865

Mills at Bridgeport, Connecticut, and Indianapolis, Indiana • In Canada: Noranda Copper and Brass Limited, Montreal

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CLEVELAND

Top Quality

fasteners

for particular fastener users

Cap Screws

Hex (bright and high carbon), Socket, Flat Socket, Fillister, Flat

Set Screws

Square head, cup points standard —other points special

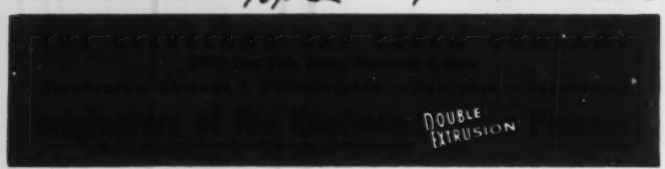
Milled Studs

Standard or special threads

Complete range of sizes from ¼" dia. Also larger than usually listed—Hex Heads to 2½" dia.; Flat Heads to 1" dia.; Set Screws to 1½" dia., in required lengths.

Write for catalog.

CLEVELAND *Top Quality* FASTENERS



Arc Smelting for Zinc

Heat generated by an electric arc furnace is used to smelt zinc efficiently

NEW METHOD for smelting zinc ores uses heat generated by an electric arc to carry on the reduction. It is announced by New Jersey Zinc Co., New York.

Called the Sterling process it has been used on high grade zinc concentrates from which substantial recovery of secondary values can be realized.

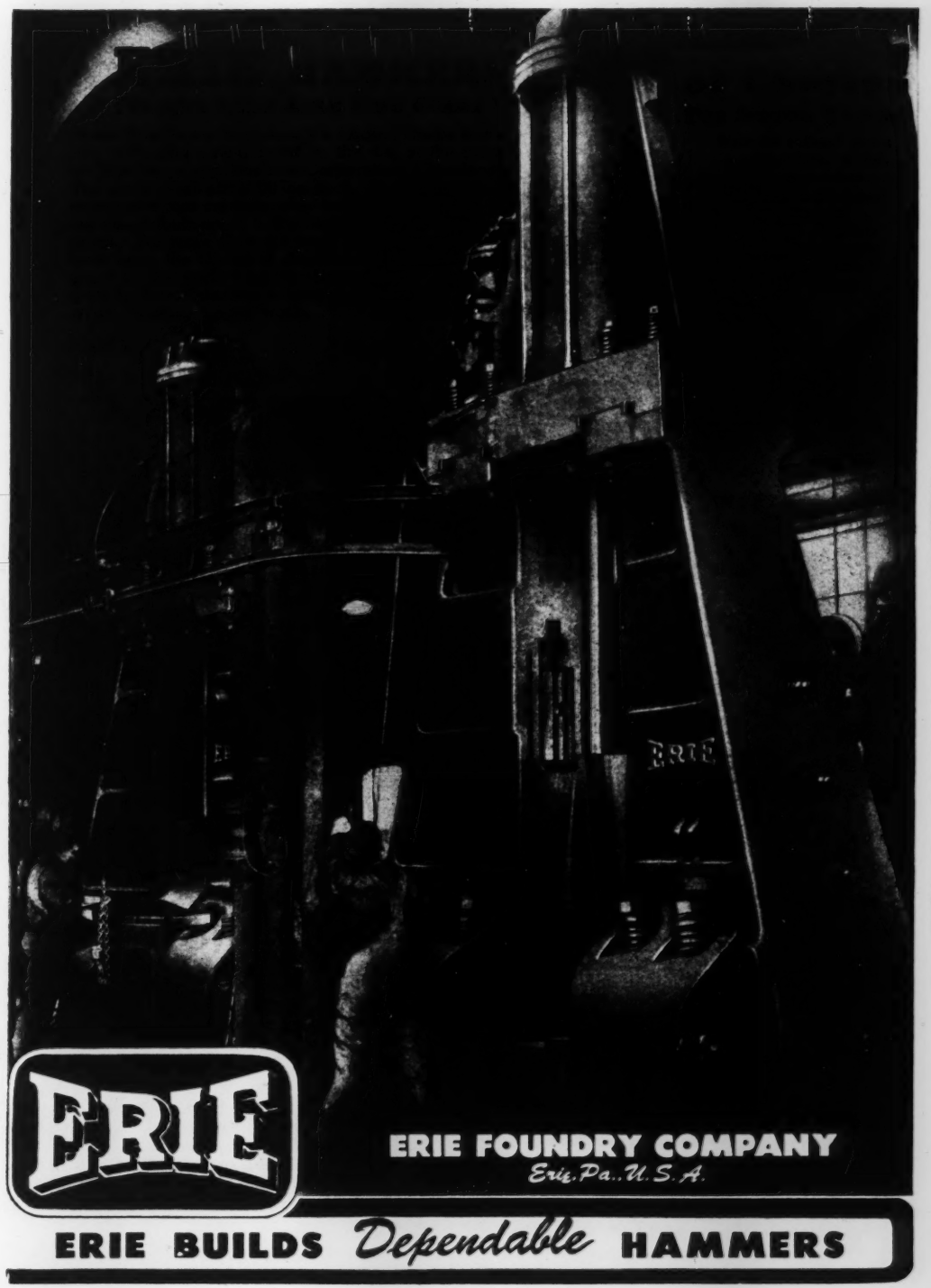
Control Factor—Zinc metal, together with its accompanying values, and iron are produced. In solving the problem of smelting zinc in an arc furnace it was necessary to establish means of controlling the heat distribution so very high elimination of values could be attained and a condensable zinc vapor produced. At the same time a satisfactory furnace life was an economic requisite.

Charge is carefully proportioned to contain the theoretically required amount of carbon for reduction of zinc, lead, cadmium and part of the iron. The heat is generated partly by resistance of slag in the path of the current and partly by open arcs between the electrodes and slag bath.

Radiated Heat—Heat of reduction is largely that radiated directly from the arcs to charge banks which are fed through charge ports in the roof adjacent to the walls. The residue melts down and is tapped off as slag, and reduced iron forms a bath beneath the slag and is tapped off from time to time.

Condensation of the zinc vapor, which is more dilute and more difficult to condense than vapor from the retort processes, is successfully acomplished in splash type condensers. Approximately 75 to 80 per cent of the zinc vapor is tapped as molten zinc. With high grade concentrates, a zinc recovery of 95 per cent is attained.

Furnace now in operation has a capacity of 35 tons of zinc a day. W. M. Peirce, plant engineer, says the first run was a success, and with some changes, further success is hoped for. He emphasizes that development of the process has reached the point where commercial application may be expected.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ERIE BUILDS Dependable HAMMERS

FEATURING:

- **OPERATING ECONOMY**
- **GREATEST DURABILITY**
- **LOWEST MAINTENANCE**

You can save REAL money on the operation of electric trucks. Ready-Power DIESEL-Electric drive is the answer. Actual tests prove savings of 40% to 70% in operation and maintenance. Rugged DIESEL design provides *more* work per gallon of fuel, *longer* life span and *less* maintenance. And Ready-Power DIESEL-Electric Units provide the most efficient, most constant, most economical power source for electric industrial trucks.

Remember...Your Truck Is No Better Than Its Power!

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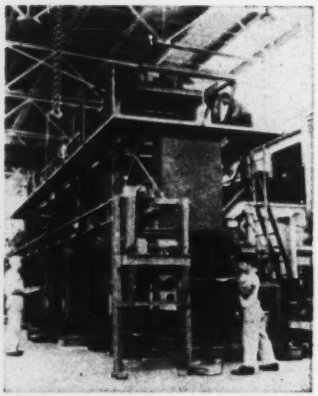
The READY-POWER Co.

3824 Grand River Ave., Detroit 8, Michigan

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units, Gas and Diesel-Electric Power Units for Industrial Trucks



Barrel Furnace Assembly

Special automatic gun barrel hardening, quench and draw furnace is seen at Lindberg Engineering Co.'s plant No. 1 in Chicago. Completely packaged units are assembled here in the main bay of the Chicago plant. The barrel furnace, including automatic loading and unloading devices, is 42 feet long, 10 feet wide, 19 feet high

Productivity Boost Forecast

U. S. industrial productivity must be increased 45 per cent in the next 10 years, according to Frank R. Benedict, Westinghouse Electric Corp. engineering executive. Mr. Benedict spoke to the convention of the American Institute of Electrical Engineers in Chicago recently.

Insistent demand for a constant improvement in standard of living by a steadily increasing American population was the reason given for the expansion.

Strain Gage Meetings Set

Application and utilization of the bonded resistance wire strain gage in engineering measurement and automatic control in industry will be covered in a series of conferences scheduled for five western cities, November 11-25.

Programs in Dallas, Albuquerque, N.M., Los Angeles, San Francisco and Seattle will cover past, present, and future uses of SR-4 strain gages with actual SR-4 devices demonstrated. Frank G. Tatnall, manager of testing research, Baldwin-Lima-Hamilton Corp., is program director.

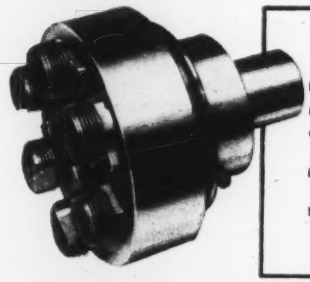
NAMCO VERS-O-TOOLS and COLLAPSIBLE TAPS

SET THE STANDARD

for continuous, high production on rocket tube threading

On this rocket job these Namco threading tools outperformed any other method—in time-saving, in sustained quality and in trouble-free operation. The procedures we helped work out for the first pilot installation have since been *adopted as standard at ten other plants contracting for the same job.*

Regardless of the type of threading work you are doing, may we show you how the same basic principle can be applied to save you time, money and materials—with Namco Vers-O-Tools and Collapsible Taps?



JOB FACTS

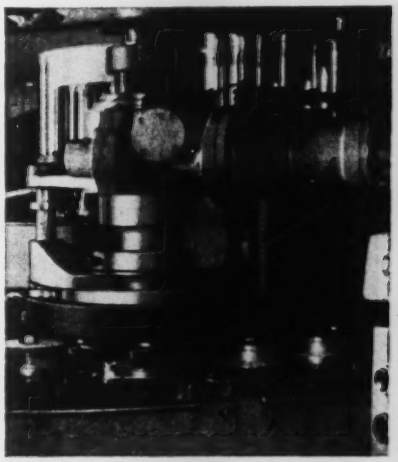
PART—Rocket Nozzle

MATERIAL—X 1117 Steel

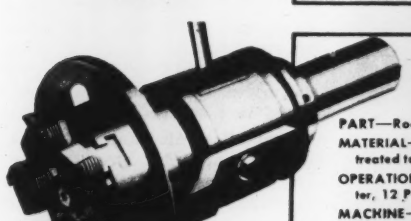
OPERATION—Thread 4 3/4" Diameter, 12 Pitch, Class 2 Fit

MACHINE—W. F. and John Barnes Drill

DIE HEAD—Namco Type DR 4 7/8" Vers-O-Tool with 6 ground thread circular chasers



Namco Type DR Vers-O-Tool Die Head threading rocket nozzles on a W. F. and John Barnes Drill—Firestone Steel Products Division Plant, Akron, Ohio



JOB FACTS

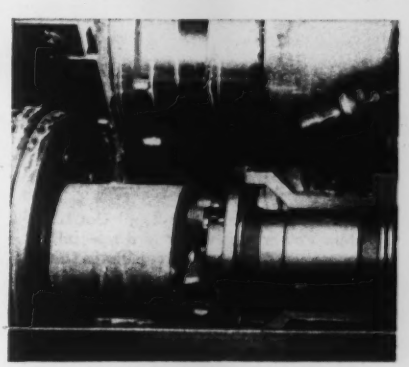
PART—Rocket Motor Tube

MATERIAL—NEA-8620 Steel, heat-treated to Rockwell C-28-30

OPERATION—Tap 4 3/4" Diameter, 12 Pitch, Class 2 Fit

MACHINE—Lehman Double-End Tapper

TAP—Namco Type RST 5" Collapsible with 5 ground-thread circular chasers.



Namco Type RST Collapsible Tap tapping rocket motor tube on Lehman Double End Tapper—Firestone Steel Products Division Plant, Akron, Ohio

ASK FOR NEW CATALOG DT-52 . . .

for complete information on Namco Vers-O-Tools and Namco Collapsible Taps, available with ground thread precision chasers.

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Acme-Gridley Bar and Chucking Automatics: 1-4-6 and 8 Spindle • Hydraulic Thread Rolling Machines • Automatic Threading Dies and Taps • The Chronolog • Limit, Motor Starter and Control Station Switches • Solenoids Centrifuges • Contract Manufacturing

Copper-Clad Plate

Lukens says it is beginning commercial production of the clad steel product

COMMERCIAL production of copper-clad steel plate, an engineering material combining special properties of copper and steel, is announced by Lukens Steel Co., Coatesville, Pa.

Copper-clad steels should meet a need for many electrical, heat transfer and corrosion applications requiring copper's high conductivity and corrosion resistance combined with steel's low cost, strength and rigidity. Applications will include electrical apparatus, evaporators, hot water heaters, heat exchangers, tube sheets, tanks and vessels.

Simplified Fabrication—Combining unique chemical and physical characteristics with good fabrication properties, copper-clad steels simplify problems of equipment and fabrication in many types of applications. The company says fabrication time can be cut considerably, reducing production costs.

For many types of equipment a smaller thickness of copper-clad steel can serve the same purpose as a thicker section of solid copper. This should mean further saving through reduced material costs and reduced space and weight.

Specifications — Available in plate gages only, Lukens' copper-clad product consists of a copper layer permanently and uniformly bonded to one side of a carbon steel backing plate. Cladding percentages of 10, 15 or 20 per cent of total plate thickness will be regularly furnished in plate sizes up to 120 inches wide, 380 inches long and 3/16 to 1¼ inches thick. Copper-clad steels are also available in flanged-only or flanged and dished heads.

Homogeneous and dense in structure, the copper is unchanged in any way by being bonded to the steel. Characteristic corrosion resistance and electrical conductivity are assured.

Two types of cladding are regularly furnished: Oxygen-free high conductivity copper for special electrical applications; and phosphorus deoxidized copper for improved weldability. Other copper and copper alloys also can be produced in the form of clad steels.

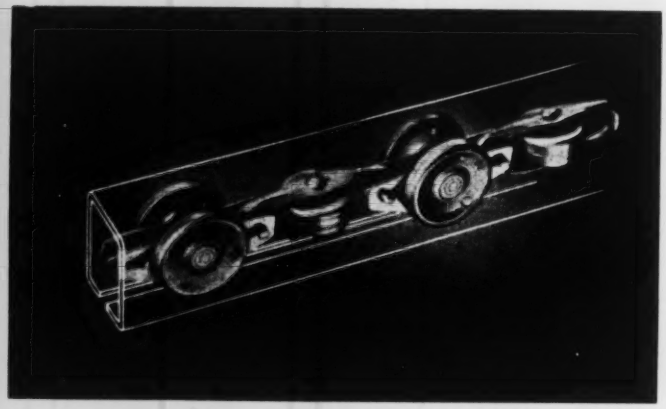
Properties—Mechanical properties of copper-clad steel are governed by the type of backing steel used. The backing may be any of the plain carbon or low alloy steels, flange or firebox quality, conforming to ASTM or ASME specifications.

According to the company, its copper-clad can be sheared, formed or rolled according to standard procedures. They add that uniformity of cladding thickness facilitates fit-up and aids welding.

Power Crane Production Soars

The power crane and shovel industry will expand by more than two-thirds of its size on Jan. 1, 1951, if the Defense Production Administration realizes its long-term goals. DPA hopes for an annual production rate of 24,000 units by Jan. 1, 1954. This is 9500 units above the capacity three years earlier.

Certificates of necessity already



Chain your costs down

with R-W "Zig-Zag" Continuous Power Conveyor

Richards-Wilcox "Zig-Zag" Continuous Power Conveyor is a specially constructed, motor-driven chain that travels through a steel, tube-like track. The unit is continuous; travels up and down, in and around, anywhere in the plant; carrying loads up to 125 pounds at all speeds from 1 inch to 60 feet per minute. Installation is easy and inexpensive, and may be quickly adapted to conform to plant alterations. Among its major advantages, "Zig-Zag" puts "dead" space to work—releases personnel for other duties—increases efficiency and keeps costs down.

***Write for** complete information, or contact your nearest Richards-Wilcox engineering office for consultation at no obligation.*

Your best buy for economy and flexibility!

- Horizontal and vertical units alternate in a continuous chain traveling through special steel tubing.
- Complete flexibility for installation in any plant. Easily installed, easily changeable to conform to plant alterations.
- SAFE—all moving parts are fully enclosed.
- Low first costs—low power factor.
- Standard horizontal and vertical curves—two-foot radius.

Richards-Wilcox Mfg. Co.
A HANGER FOR ANY DOOR THAT SLIDES
AURORA ILLINOIS U.S.A. Branches in all principal cities

1880 RICHARDS WILCOX RW AURORA 1952
Reg. U. S. Pat. Off.
OVER 72 YEARS

Machine tool idea pool

In designing machine tools, as in planning countless other products, OSTUCO Steel Tubing provides an endless pool of practical ideas because of its *unlimited adaptability*. Collets, chucks, spacers, spindles, bearings, shafts, ferrules, and handles are but a few of the applications.

By varying the radius of a bend, the length of a taper, the dimension of an upset, etc., an old design can be improved or a new one created. By combining such operations, a part can be made to serve several functions, thus simplifying design. Parts may even be fabricated or forged beyond recognition as a tube section.

Whether you design machine tools or products of a distinctly different nature, you will want to investigate the many quality-improving, cost-reducing features of OSTUCO Tubing. We cannot always promise early delivery estimates on new civilian orders, because of military demands, but it will pay you to consult our experienced engineers about OSTUCO Tubing when redesigning your products to meet future competition.

Write for informative free booklet, "Fabricating and Forging Steel Tubing," showing the many basic fabricating and forging operations OSTUCO can perform.

THE OHIO SEAMLESS TUBE COMPANY

Manufacturers and Fabricators of Seamless and Electric Welded Steel Tubing

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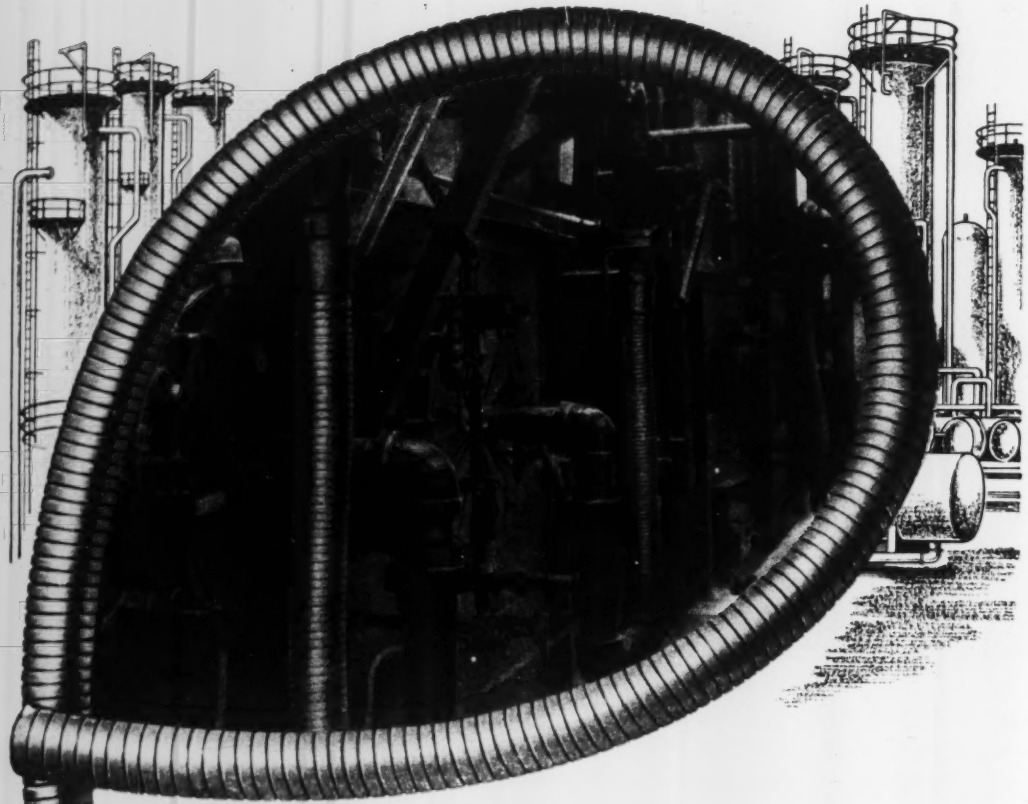


CORRUGATED "MUSCLES" THAT LET PIPES MOVE

PENFLEX METAL HOSE ABSORBS THERMAL EXPANSION . . . PREVENTS JOINT LEAKS

Petroleum still burners like this one in Kermit, Texas, put heavy strains on piping. Thermal expansion, contraction and physical shock make safe sealing of burner pipe joint assemblies a vital requirement.

Penflex flexible metal hose with couplings is used on these burners to absorb any pipe movement due to extreme temperature and pressure changes. Lengths of 4" I.D. interlocking, four-wall galvanized steel hose are installed on each burner. Provides outstanding safety and high, uninterrupted flow of volatile fluids. Leakproof, tough and *flexible*.

Penflex engineers can help you solve flexible tubing application problems. Penflex manufactures a complete line of four-wall, interlocking and seamless welded corrugated tubing . . . from ⅛" I.D. and up . . . automatic barrel fillers, accessories and fittings. Write for illustrated folder, "Flexineering," containing valuable flexible tubing data for your product application.

Pennsylvania Flexible Metallic Tubing Company, Inc., 7219 Powers Lane, Phila. 42, Pa.

Branch Sales Offices: **Boston • New York • Chicago • Houston • Cleveland • Los Angeles**

Penflex

HEART OF INDUSTRY'S LIFE LINES

Added Thread Muscle

WHEN THE engineers at Marchant Calculating Machine Co., Oakland, Calif., switched from aluminum to magnesium castings for the side covers of their calculating machine, they reduced the weight of their design. But they had to offset a limiting physical characteristic of the magnesium — its low tapped thread strength.

Required strength in the metal was obtained by installing Heli-Coil thread inserts into the prepared thread bosses of the cast covers. Three inserts are used in each cover, forming 5/16-18 internal threads 5/16-inch long.

Inserts are coils of diamond-shaped stainless steel wire. They give about 50 per cent more strength than is possible in the magnesium alone. They also protect the tapped threads against damage. Coils are made by Heli-Coil Corp., Danbury, Conn.

cover the bulk of the expansion. The increase is made up of 6000 units of the ordnance type of cranes and wreckers and 3500 units of power cranes and shovels other than the ordnance type.

Salvaging aircraft is one of the principal uses for ordnance cranes, although every branch of the armed forces needs them.

Powder Brass: A New Review

Design principles plus new mechanical properties are combined with an analysis of cost and production factors in a manual, "Facts about Pressed Brass and Other Nonferrous Powder Parts." Published by New Jersey Zinc Co. and written primarily for designers, engineers and metallurgists, the 32-page handbook should provide a concise reference to selection factors for small structural parts to be fabricated by powder metallurgy.

Topics in the first of two main divisions cover maximum and minimum sizes, practical shapes, physical and mechanical properties, precision and tolerances, plating and other finishes, production speeds, raw material and tool costs. Section two presents informative analyses of 24 case histories of commercial parts to illustrate

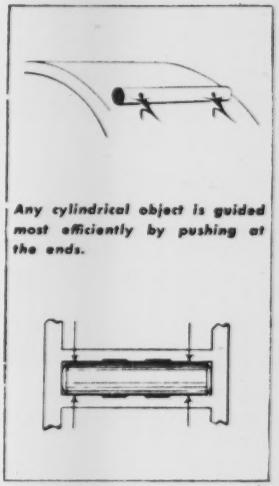
RBC

PITCHLIGN

Rollers Cannot Cock or Skew!

The middle point of a roller tending to skew remains practically constant, whereas the ends tend to move the greatest distance out of parallel. For this very reason, the cage of a PITCHLIGN bearing has been designed to guide the rollers at their ends where any tendency to skew is *immediately* corrected. Further, the rollers are aligned at their *pitch circle*, the most efficient plane for roller guidance.

PITCHLIGN bearings are dimensionally interchangeable with precision needle bearings. Get all the facts!



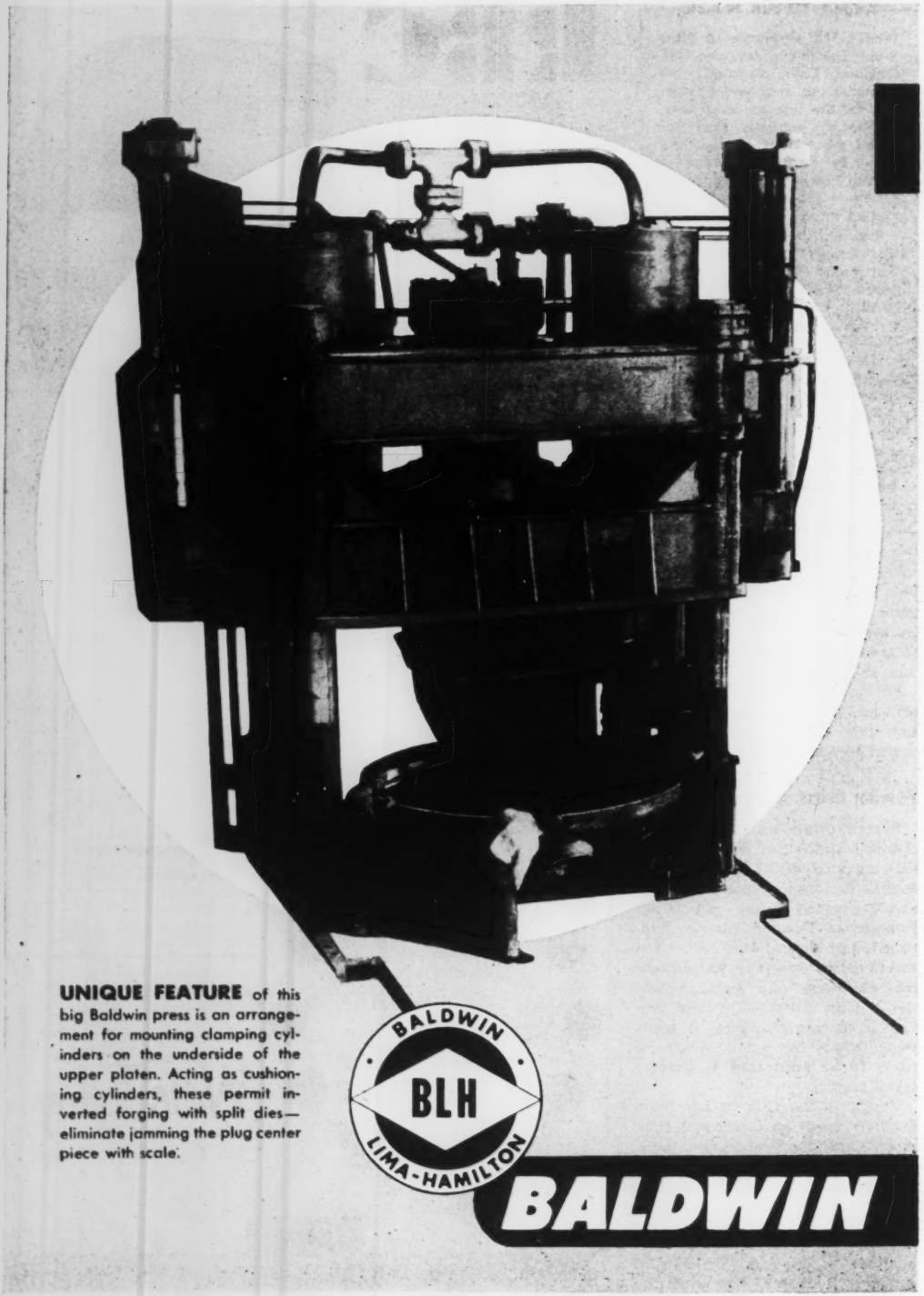
Any cylindrical object is guided most efficiently by pushing at the ends.

PITCHLIGN TRADE MARK ROLLER BEARINGS

Write Today

Ask for Bulletin SF-566

ROLLER BEARING COMPANY OF AMERICA • TRENTON, N. J.



UNIQUE FEATURE of this big Baldwin press is an arrangement for mounting clamping cylinders on the underside of the upper platen. Acting as cushioning cylinders, these permit inverted forging with split dies—eliminate jamming the plug center piece with scale.

LUKENS forges a head with its newest BALDWIN press

Thanks to its Baldwin-built 2000-ton press, Lukens now can produce deep-drawn shapes to close tolerances in a single operation. Through its extensive pressing facilities, headed by this new 2000-tonner, Lukens' customers get better heads and heavy plate shapes with other important benefits.

Ask Lukens' production people how they like this Baldwin press. They'll tell you about versatility—the ease of operation—the open design that makes it easy to reach every part—the simplicity of maintenance.

An outstanding feature, they report, is the exceptional rigidity. There's no distortion under tough jobs. Which, of course, pleases the press operators, for they can more easily hold close tolerances.

Like most large Baldwin presses, this 2000-tonner represents a combination of our ideas and those of Lukens' experts. This is typical of the way we blend our design experience with that of customers' to come up with *better presses.*

—and explains why most of the large flanging presses produced each year are Baldwin-built.

Because of their rigidity—and other outstanding features—you'll find a lot of Baldwin hydraulic presses in the Lukens' shops.

- **Baldwin 1500-ton flanging & piercing press**
- **Baldwin 800-ton press**
- **Baldwin 500-ton sectional flanging press**
- **Baldwin 44-ton hydraulic slab-holding fixture for edgewise welding of clad-steel flanges**
- **Baldwin bending roll**
- **Baldwin 125-ton gap press**
- **Baldwin 36' plate planer to bevel steel plate prior to welding**
- **Baldwin 75-ton press for flattening ring flanges**

The Baldwin 2000-ton press has a moving-down platen operated by two 40-inch rams and carries a 40-inch, 1000-ton double-acting center ram. A stripping cylinder is mounted inside the bottom platen with a 600-ton cushioning cylinder located below.

-LIMA-HAMILTON

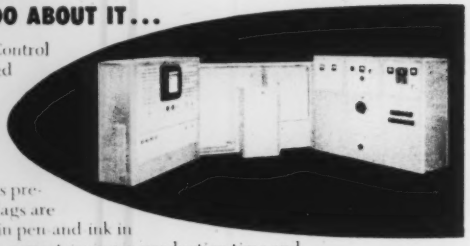
General Offices: Philadelphia 42, Pa. • Offices in Principal Cities

YOUR PRODUCTION AND PROFITS ARE BEING LOST HERE!

Are You Wasting Critical and Expensive Materials In Your Slag Heap?

Steel producers know that up to 20% of the alloying elements used in special steels, which have to be present, often are lost in the slag. Constant and tedious laboratory analysis of both the steel *and* the slag is necessary to maintain proper production control. In addition to loss of money in replacing these elements, much time can be wasted in actual production.

HERE'S WHAT YOU CAN DO ABOUT IT...



The ARL Production Control Quantometer—long used for chemical analysis of steel and other alloys—has now been adapted for the analysis of slags! Accurate percentages of elements present in *both* steel and slags are recorded permanently in pen and ink in less than two minutes... a great saving in production time and money. This makes it possible to prevent material loss *before* it occurs. Individual Quantometers are not limited to a single type of analysis, but can be designed to meet the requirements of many plant problems. As many as 25 elements as selected by the user can be accurately measured on the instrument—up to 20 simultaneously. The ARL Quantometer is the most advanced type of spectrometer yet developed, and its use can mean a great saving to you in production control costs and vital materials conservation. Write for complete information.

THE ARL LINE ALSO INCLUDES 1.5 AND 2-METER SPECTROGRAPHS, PRECISION SOURCE UNITS, RAMAN SPECTROGRAPHS AND RELATED ACCESSORIES.

See You at the Metals Show! Booth No. 1757

Applied Research Laboratories

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Plug-Welding Fishtails

The stud welding gun is used here to plug-weld the fishtail to coiled strip in a way that elim nates need for banding. This was one application shown by Nelson Stud Welding, division of Gregory Industries Inc., Lorain, O., at the Iron & Steel show

phases covered by topics in section one.

A picture sequence shows how structural parts are made from metal powders and is included with a reference page of standards and definitions used in powder metallurgy. Copies are available from the company, Front & Fletcher Sts., New York 38.

Special Tool Ups Shell Output

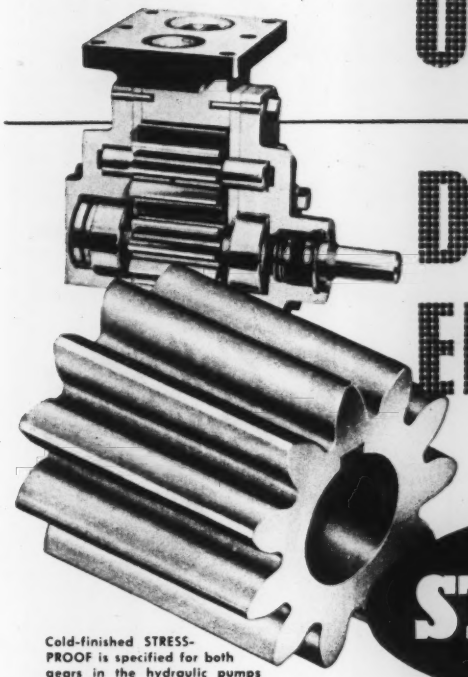
Eight traversing motor shaft-type drilling units designed into a special machine built by Bartlett Engineering Co., Rockford, Ill., are speeding production of 60mm mortor shells for Line Material Co., Milwaukee. Operation of the eight-unit machine is completely automatic.

The two-station tool employs one operator for feeding and unloading both stations at the end of each cycle. It drills sixteen 5/16-inch holes in each fin, drilling the four upper holes, indexing 180 degrees, then drilling the remaining four.

The workholding spindle then rises and operations are automatically repeated for the eight lower holes.

Under this setup, output is upped to 300-400 pieces per hour. The drilling units, made by Black Drill Co. Inc., Cleveland, provide the

CARBURIZING UNNECESSARY



Cold-finished STRESSPROOF is specified for both gears in the hydraulic pumps made by Anthony Co., Streator, Ill.

DISTORTION ELIMINATED

ON THIS ANTHONY PUMP GEAR WITH . . .

STRESSPROOF®

SEVERELY COLD-WORKED, FURNACE-TREATED, COLD-FINISHED STEEL BARS

STRESSPROOF has been specified for years for this Anthony hydraulic gear. Gears made of STRESSPROOF have the high accuracy required for quiet, efficient operation. Also, they will run for the life of the equipment without appreciable wear or pitting.

Carburized gears, the alternate for STRESSPROOF, distort in hardening. Costly finishing operations are then required or noisy, inefficient gears result. STRESSPROOF, on the other hand, is used as machined . . . gives accurate, highly finished gears with long, trouble-free life.

STRESSPROOF's value to manufacturers like Anthony Company stems from its unique combination of four important qualities in the bar—(1) *high strength*; (2) *machinability*; (3) *wearability*; and (4) *minimum warpage*. STRESSPROOF costs less than other quality cold-finished bars. It is available in cold-drawn or ground and polished finish.

SEND FOR Free Engineering Bulletin "New Economies in the Use of Steel Bars."

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necessary fast advance, positive feed and quick return after complete break-through.

Man Against Machine

Output climbs 300 per cent in assembly test on wood shipping containers

ALTHOUGH the battle that pits a man against a machine was long-ago settled, it was refought recently in Atlanta to produce an interesting report for manufacturers of wooden shipping containers, including those who turn out Armed Service units.

The contest in point demonstrated how a new automatic nailing

TREADLE-OPERATED NAILER
. . . cuts, drives in one motion

machine can increase output more than 300 per cent over hand effort in making shooks. In plants where output already hits a satisfactory level, one man can do the work of three or four.

Superiority Illustrated—G. Mack Wynn, Auto Nailer Co. production vice president, staged the time-methods study to illustrate the extent of automatic nailing superiority over hand methods. After an hour's run, the nailer completed 11.6 assemblies; the worker, wielding only a hammer, knocked together 2.9. Assemblies consist of a bottom skid, two sides, front and back.

The nailer cuts and drives its own nails in one motion. It can be applied to all types of skid and shook production, as well as plastics and general woodworking op-

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Call SIMONDS First!

Convenient, central location and nearly 60 years of specialized experience make SIMONDS your *logical source* for large industrial gears. SIMONDS GEAR is able to assure you fast, accurate service on all types and sizes—Spur Gears up to 145", Bevel Gears up to 60", Worm Gears up to 72" . . . also worms, racks and pinions. Materials include cast or forged steel, gray iron, bronze, Meehanite, rawhide and bakelite. Whether your next heavy gear need is "rush" or "regular" . . . call SIMONDS first.

Stock carrying distributors for Ramsey Silent Chain Drives and Couplings, industrial V-Belts.

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We Serve Steel Better Knowing Copper Alloys Best

We specialize in copper and copper-base alloys such as bronze. And we cast these metals for steel industry use by the most advanced methods. For example . . . this manganese bronze slipper is made by our permanent mold technique and requires *no machining* after casting except for the pin hole. Oil grooves are actually cast-in. Surface hardness is completely controlled, and our customers realize dollar savings through our production-run economies.

National Bearing Division offers you the benefits of more than 50 years of experience, metallurgical research and production-run facility development.

Our 6 centrally located plants are ready to serve you. Contact National Bearing Division for full information.

A FEW NATIONAL BEARING STEEL INDUSTRY PRODUCTS: Bosh Plates • Monkeys • Tuyeres • Coolers • Mantel Plates • Stack Plates • Roll Neck Bearings • Housing Nuts • Babbitt Metals • Slippers

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erations. Nails are driven as fast as the treadle can be depressed, or the rate hits three per second when the treadle is held down.

Jigs Unnecessary—In the time-methods study, skids were ¾-inch nailed onto 1¾-inch boards; the remaining pieces were ½-inch plywood nailed onto ¾-inch cleats. Top and skid measured 17½ x 21¼ inches; the other members were 21¼ x 67 inches.

No jigs are necessary for efficient operation. Nail length is controlled by a dial selector. The machine not only cuts and drives in one motion, but counter-sinks and clinches at the same time. Pressure exerted is 1000 pounds, effecting considerable pressure between members nailed and making assemblies rigid.

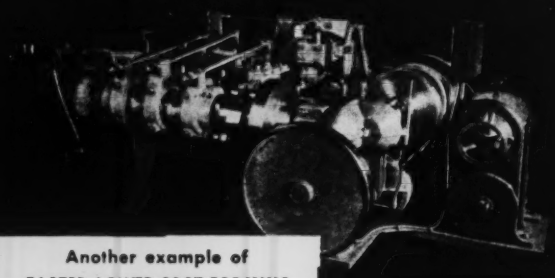
Tap and Die Sizes Published

"Taps and Dies for Unified and American Screw Threads," is an 8-page pamphlet prepared by Tap and Die Division of the Metal Cutting Tool Institute.

Included in the pamphlet are tables listing available standard hand taps in numbered and fractional sizes and tap recommendation tables for all classes of unified and American screw threads. Three pages are devoted to an explanation of the system of standardization and the tables themselves.

Copies are available from the institute offices, 3114 Chrysler Bldg., New York 17, at 50 cents each.

PRODUCTION RECORDS *Broken* with NILSON 4-SLIDE *Machine!*



Another example of
FASTER, LOWER COST FORMING
of Ribbon Metal Stock

★ *180 Terminal Contacts* Per Minute ★ *7 Separate Operations* Eliminated

A famous national manufacturer tripled production of the Terminal Contact illustrated above (in actual size) and reduced production costs proportionately by replacing several progress die set-ups with one Nilson 5-3-8 four side machine. *Seven separate operations were eliminated;* 180 completed contacts produced per minute. Time required for tooling changes was reduced 50% over similar type machines.

This example clearly shows the big savings you can make in overhead, maintenance, labor and time with a Nilson 4-slide!

Taking stock directly from the coil, **NILSON** metal ribbon stock four-slide machines automatically feed, straighten, pierce, blank, swage, stamp, coin, cut off and perform up to five forming operations with speed and accuracy. Built in five models with capacities up to 2⅛" wide and feed lengths up to 15". For specific recommendations on your wire and ribbon metal forming problems, send details, prints or samples of your operation to us when you request the bulletin.

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Specialists in Wire Forming Equipment for Over 50 Years

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OTHER NILSON PRODUCTS:

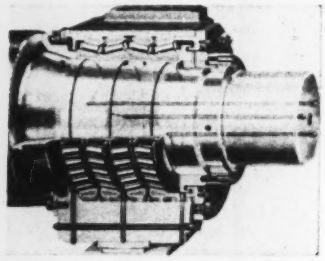
- Automatic chain making machines
- Automatic staple forming machines
- Wire and Stock reels
- Foot Presses
- Wire straightening equipment
- Slide Feeds for Presses

Bearing Has Tapered Bore

New four-row tapered-bore bearing for high-speed mills features easy assembly

ANNOUNCED by the Timken Roller Bearing Co. is the new four-row type TQIT tapered-bore bearing which combines maximum bearing capacity and interference fit with easy removal. It was shown for the first time at the 1952 Iron and Steel Engineers convention in Cleveland.

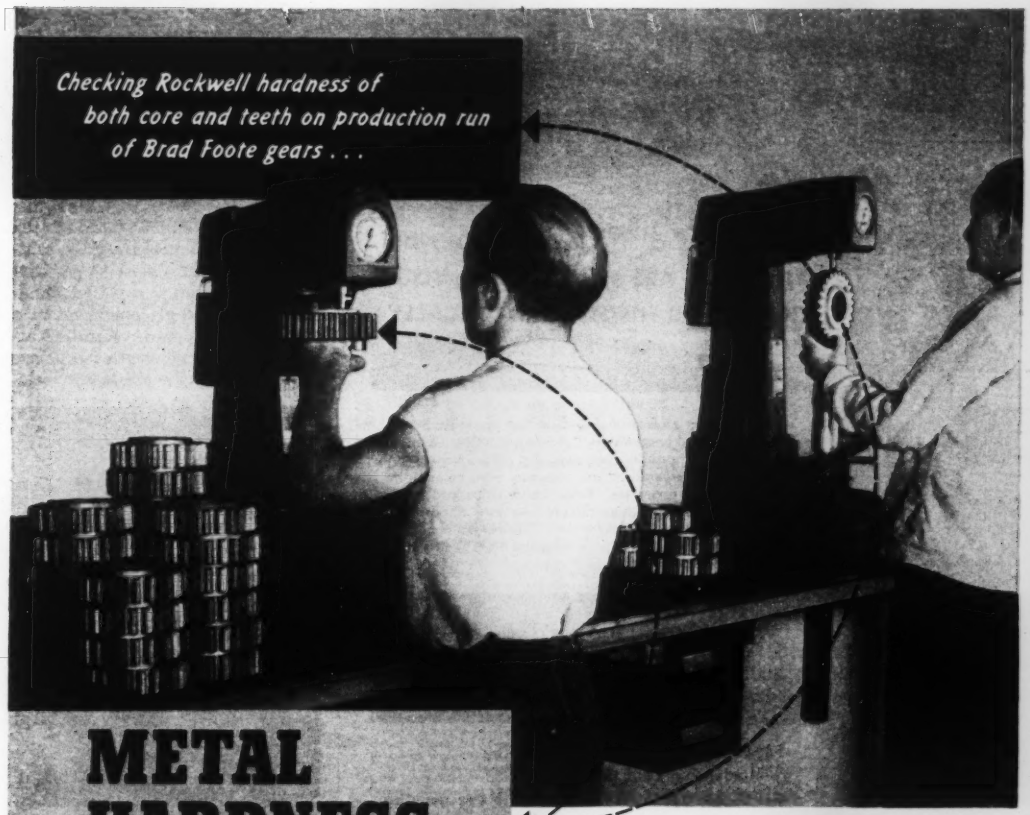
Designed for use on high-speed mill applications, the bearing assembly consists of four rows of rollers with the outer rows indirectly mounted. This arrangement permits maximum neck diameters and improved load distribution. Two double cups and one spacer make up the parts that fit in the chuck bores.



HIGH-SPEED BEARING
. . . is removed hydraulically

Tapered Cones — Parts making up the inner races consist of two inversely tapered single cones at alternate ends and one double tapered bore cone mounted between them.

A hydraulic jack was developed to press the bearing and chuck assembly in place on the roll neck. The bearing and chuck assembly



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• Here at BRAD FOOTE we make sure of metal hardness. We hold to extremely close tolerances checked carefully on the latest and best hardness-testing equipment. Nothing is left to chance, and no one shares our responsibility. So, when you buy BRAD FOOTE gears for your own use, or for use on equipment you make for others, you know that they will give long, satisfactory service.

• BRAD FOOTE makes every type of gear, out of any type of material. BRAD FOOTE makes speed reducers, gearmotors, transmissions, and intricate power units. We would like to discuss your requirements and make recommendations, or quote on your specifications. We'll give you prompt service.

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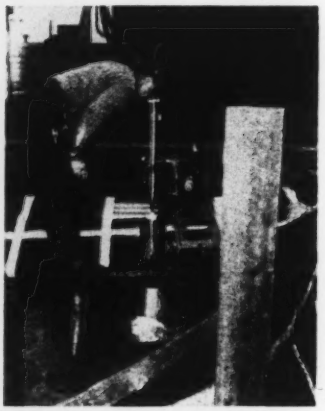
can be removed from the roll neck by expanding the cones with hydraulics.

Machine Cutting

Cropping and make-ready for welding take 8 hours; need little finish-machining

MACHINE-CUTTING slashed the time needed to prepare steel castings for welding almost 88 per cent when this practice replaced hand-cutting on a single operation in a Cleveland shipyard. Results attained show rough casting ends are cropped and made ready for welding in 8 hours. When hand cutting was employed for the same job, the time required reached 66 hours.



MACHINE CUTTING
. . . *means faster cutting preparation*

Less Fatigue—An Oxweld C-43 machine-cutting blowpipe, made by Linde Air Products Co., New York, is mounted on a modified Oxweld CM-16 cutting machine to do the actual cutting. Before this setup was installed, casting ends were cropped with a hand-operated oxy-acetylene blowpipe. This left cuts requiring considerable chipping and finish grinding before they were smooth enough to be welded.

Hand-cutting also caused problems of operator fatigue due to time and effort required to cut the heavy sections. In addition to increased speed that produces cuts which need little finish machining, effects of machine-cutting indicate less fatigue and resulting reduction in delays.

Twin Track—The cutting ma-

THE FERRY CAP & SET SCREW CO.

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"SHINYHEADS"

America's Best Looking Cap Screw

Made of high carbon steel — AISI C-1038 — to standards for Full Finished hexagon head cap screws — bright finish. Heads machined top and bottom. Hexagon faces clean cut, smooth and true, mirror finish. Tensile strength 95,000-110,000 p.s.i. Carried in stock.

"HI-CARBS"

Heat Treated Black Satin Finish

Made of high carbon steel — AISI C-1038. Furnished with black satin finish due to double heat treatment. Hexagon heads die made, not machined. Points machine turned; flat and chamfered. Tensile strength 130,000-160,000 p.s.i. Carried in stock.

"LO-CARBS"

Made of AISI C-1018 steel — bright finish. For use where heat treatment is not required and where ordinary hexagon heads are satisfactory. Hexagon heads die made to size — not machined. Points machine turned. Tensile strength 75,000-95,000 p.s.i. Carried in stock.

SET SCREWS

Square head and headless — cup point. Case hardened. Expertly made by the pioneers in producing Cup Point Set Screws by the cold upset process. Cup points machine turned. Carried in stock.

FILLISTER CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

FLAT HEAD CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

"SHINYLAND" STUDS

All studs made steam-tight on tap end unless otherwise specified, with flat and chamfered machined point. Nut end, oval point. Land between threads shiny, bright, mirror finish. Carried in stock.

*

ADJUSTING SCREWS

Valve tappet adjusting screws — Hexagon head style — to blue print specifications — hexagon head hard; polished if specified — threads soft to close tolerance — points machine turned, flat and chamfered.

*

CONNECTING ROD BOLTS

Made of alloy steel — heat treated — threads rolled or cut — finished to extremely close thread and body tolerances — body ground where specified. Expertly made by the pioneers in producing connecting rod bolts by the cold upset process.

SPRING BOLTS

Case hardened to proper depth and ground to close tolerances. Thread and annealed. Supplied in various head shapes, with oil holes and grooves of different kinds, and flats accurately milled.

FERRY PATENTED ACORN NUTS

For ornamental purposes. Steel insert — steel covered. Finish: plain, zinc plated, cadmium plated. Size: 9/16", 3/4", 15/16" across the flats.

Tapped 1/4" to 3/4" inclusive. Cross section of Ferry patented acorn nut, showing how steel hexagon nut fits snugly into shell.

Pioneers and Recognized Specialists, Cold Upset Screw Products since 1907

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With a MICHIGAN crane you can have the wonderful advantage of Fluid Power — giving you positive starting which means less shock to driven machinery and as much as 50% saving on electric current! MICHIGAN uses all anti-friction bearings and easily available standard mill parts eliminating costly down time losses! Low head room, too, plus a host of other engineering advances!

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Anti-Corrosive has millions of stainless steel fastenings *in stock* for immediate delivery . . . plus exceptional production capacity that can fill your requirements beyond stock items faster, *better!*

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Manufacturers of STAINLESS STEEL FASTENINGS
CASTLETON ON HUDSON, NEW YORK

Drawer Mileage

HOW MANY miles to a filing cabinet drawer? That's an unusual question submitted to engineers at Sam Tour & Co. Inc., New York.

One company, about to purchase a large number of filing cabinets, wanted a comparison of various brands. Information wanted for the evaluation was: Condition of the cabinet after a drawer carrying an 80-pound load had been opened and closed 50,000 times, increase in pull required to open the drawer after each 10,000 cycles and the number of cycles before a specified maximum pull of 3¾-pounds would be required.

To make the tests, the testing company devised a mechanical strong-arm to open and close the drawer 20 times a minute. It's a motor-driven system of arms and pivots.

Tests, by the way, were conclusive.

chine runs on a twin track section shown at right, to assure a straight cut. Four of the castings illustrated form the 40-ton stern frame of a Great Lakes ship, providing rigid support for propeller shaft, screw and counter-guide.

Frame cross-section is shaped triangularly for streamlining. Cross-section thicknesses vary from 4 inches at the leading edge to 24 inches at the trailing edge. Cutting speeds through these sections vary from 1 to 15 inches per minute. Oxygen pressure is carried 45 psi.

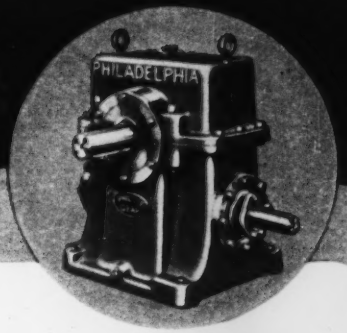
Barge Output Bogs Down

Barge construction is slowing to a standstill for lack of steel, shipbuilders say.

Some companies haven't placed barges on the ways in the last two months and are relying on repair jobs and tow boat construction to keep their yards open.

Two main problems face the barge industry: How to obtain steel and how to remain within the 30-day inventory limit when it's finally received. The shipbuilders say that steel mills indicate that they won't fill their allotment tickets for the third quarter until near end of 1952. Industry members claimed that the 30-day inven-

You can TAKE YOUR CHOICE



. . . they're all Philadelphia Worm Gear Speed Reducers

Philadelphia Worm Gear Speed Reducers vary in size and arrangement, but never in quality. Each unit is backed by 60 years of gear making experience and our reputation for the best in power transmission equipment.

Standard worm gear reducers are available in ratings to 250 horsepower, and ratios 3½:1 to 6300:1.

For full information on Worm Gear Speed Reducers, write for catalog WG51.

Philadelphia Gear Works, INC.

ERIE AVE. AND G ST., PHILADELPHIA 34, PA.

NEW YORK · PITTSBURGH · CHICAGO · HOUSTON · LYNCHBURG, VA.

Industrial Gears and Speed Reducers
LimiTorque Valve Controls

Here are three "spots" where Farrel® can help you

ROLLING MILLS – For almost a century, Farrel mills have been helping to solve rolling mill production problems. They are built in a wide range of types and sizes for rolling nonferrous rods, strips or sheets, metal foils and cold strip steel. Farrel also designs and manufactures coilers and special handling equipment required to make each installation a complete production unit.

MILL DRIVES – Specially designed to suit individual requirements, Farrel reduction gear drives, pinion stands and combination units are built in any size for any capacity. Combination units have the reduction gears and pinions in a compact, integral housing.

ROLL GRINDERS – Available in two types and nine standard sizes, Farrel roll grinders enable you to fix and maintain definite standards of accuracy and finish. Rolls are produced with a flawless surface, free from marks of any kind, ground straight, or with concave or convex contours of exact symmetry and accuracy.

Information and engineering consultation available, without obligation.

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- Universal Mill Spindles
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- Gears
- Mill Pinions
- Pinion Stands
- Gear Drives of Any Capacity
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- Roll Calipers

FB-769

tory restriction on the industry is unworkable. A shipbuilder may have to hold construction steel for several months in his yards before he gets steel plates, which are needed first in barge construction.

Tube Finishing Speeded

SPEEDS approaching special-machine output are gained in tube deburring, reaming and facing operations with a standard bench-type end finishing machine at Turner Brass Works, Sycamore, Ill.

The end finishing setup is used by Turner to replace the common practice of using regular lathes or,

END FINISHING MACHINE
. . . production rates satisfied

in some cases, slow hand filing methods. For production work, neither method proved satisfactory.

Single Movement — Time saved by the company on a variety of reaming and inside and outside deburring jobs on welded steel tubing is attributed to design that enables operator to clamp and feed the work to cutting tools with a single forward movement of the hand lever. Faster stock handling and loading is possible because the operator has one hand free.

Workpieces are released automatically by reversing the hand lever. For depth of cut, an adjustable swing-type stop operated by the feed rack provides fast and accurate positioning and gaging.

Fast Changeover—The machine

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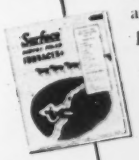

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- ☐ Are the cores tough, ductile, and shock-resistant?
- ☐ Do they always fit perfectly and require no run-in?
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- ☐ Are you completely satisfied with them?

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All PITTSBURGH gears are made to extremely close tolerances to fit perfectly right from the start. They are guaranteed to give you five times the life of untreated gears, one to one and one-half the life of oil-treated gears, and equal or longer life than any other gear in identical service.

You can readily identify **Armored Gears** by their distinctive corrosion preventive coating — "**Pittsburgh Purple**."

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Better Pilot

SINGLE-PORT pilot for top burners gives a one-third reduction in gas consumption and a 40° drop in top-of-range temperature. It's now standard on all Universal gas ranges. So says W. C. Davis, president of Cribben and Sexton Co., Chicago.

A steel, cadmium plated cone surrounds the pilot light and causes the flame to be more stable. An aluminum channel pilot flue disperses the heat evenly throughout the area under the main top. This combination gives a temperature drop to 110° on top of the range.

is designed by its manufacturer, Pines Engineering Co. Inc., Aurora, Ill., so job changeover can be made quickly and easily—usually in about 1 minute. Interchangeable chuck inserts and tool holders are provided for different operations. Chuck jaws are designed with split-type inserts.

Ballast Lightens Lighting Cost

A ballast circuit for fluorescent illumination that reduces cost of lighting was introduced recently at the national technical conference of the Illuminating Engineering Society. H. E. Bachman and C. H. Burns, both of Westinghouse Electric Corp., revealed their development in a paper entitled "A New Lead-Lag Ballast for Discharge Lamps."

The new small-size ballast has all the advantages and none of the disadvantages of existing circuits, reports Westinghouse. It is smaller in size in certain ratings, weighs less and has a lower operating cost.

New Axle—Bigger Payloads

More payload and higher load tolerances are advantages of a new steering pusher axle developed by White Motor Co., Cleveland, for its tractors in highway transport service.

Results of more than a year in highway tests show that tractors equipped with the steering pusher will legally haul approximately 4000 pounds more payload than comparable tractors. The added single-wheel axle, mounted ahead

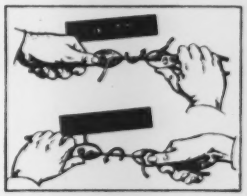
VISIT the Chase booth no. 1200 at the National Metal Congress and Convention

CHASE® WIRE gets a "physical" to make your products better

Chase wire is carefully inspected and tested to catch any defect.

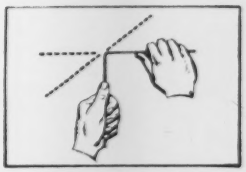
In addition to the usual tensile strength tests, it is tested for slivers or any other physical or surface defect not possible to detect by visual inspection.

Because of the high ductility and malleability of Chase wire, it is superior for cold-heading, drawing, forming, shearing and many other operations. Chase brass wire is available in a wide range of color from copper red to golden color.



TEST NO. 1. Chase wire is twisted ten times in each direction to reveal seams, slivers, as well as other irregularities.

TEST NO. 2. Only wire of the very highest quality can pass this exacting 360 degree wrap-around test for forming.



TEST NO. 3. Chase wire is bent sharply at right angles in four different directions to reveal possible brittle condition.

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of the driving axle, weighs only 1350 pounds with tires. It steers in co-ordination with the tractor's front axle steering. Tractors so equipped can be interchanged with all trailers.

DPA Sets New Expansion Goals

New expansion goals for basic refractories and insulating fire brick refractories and a revision of the goal for tugsten ores is announced by the Defense Production Administration. The goal for basic refractories is established at 140 million nine-inch equivalent in terms of a standard brick as of Jan. 1, 1954. This compares with the industry capacity of 75 million nine-inch equivalent on Jan. 1, 1950. DPA says it has issued certificates of necessity for the entire goal.

The expansion goal for insulated fire brick is 56 nine-inch capacity on Jan. 1, 1954, compared with 42.8 million nine-inch capacity equivalent on Jan. 1, 1950. This goal is nearly completed.

The revised goal for tungsten ores is set at an annual capacity of 40 million pounds in 1954. That's an increase of 6 million pounds over the previous goal set for 1954. The revised goal calls for an increase of 31 million pounds per year over 1950, as the U. S. imports most of its supply of tungsten ores.

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No. 10-R UNIVERSAL RAM • TURRET TYPE • VERTICAL
MILLING MACHINE
You get a wider work range than with any other machine this size. You can machine at any angle — vertical, horizontal or both. You can mill, drill or bore at any angle. Hence resetting isn't necessary. Just change the machine — changing is quick. (For vertical and regular horizontal milling, use the 10-RH.) Jobs are done faster and better . . . at less cost. • It's Universal • Rugged • Easy to Operate.
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For deep, heavy cuts. Permits working to extra close limits. Any angle up to compound 2-way. Request Bulletin 4.
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Faster Stainless Polishing

POLISHING stainless steel down to a No. 4 finish is a job done daily at Claus Mfg. Co., Cleveland.

As part of a cost reduction drive, the firm reports it switched to air-inflated grinders on this operation. Result: Finishing takes only about half the previous time.

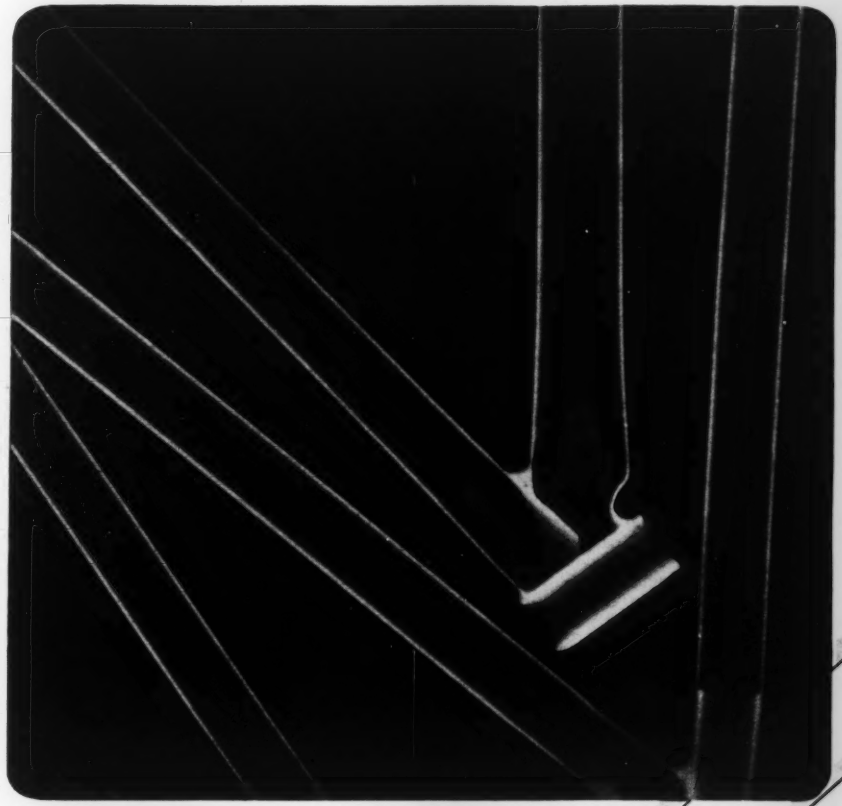
Deep drawn stainless sink bowls come to Claus in a 2B finish. These

AIR INFLATED GRINDERS
. . . time cut reaches 50 per cent

are welded in stainless steel sink tops that have a standard No. 4 mill finish. Finishing the bowls to match the tops posed a tough problem when done with hard-wheel grinders, says the company. One trouble spot resulted when chatter and bounce tended to produce a herringbone finish.

Two Sizes—Claus uses grinders in two sizes, supplied by Nu-Matic Grinders Inc., Cleveland. One is 5 inches diameter by 3½ inches wide; the other, 3¼ inches diameter by 3 inches wide. Both consist of a rubber drum mounted on a core assembly. The operator slips an abrasive band over the

Radiography checks—



then double checks

LANDING GEAR STRUTS lead a life of punishment. Though light, they must be strong. Their joints must be sound. Radiography is the method used to prove them sound.

A maker of amphibian aircraft goes even further. Though treated and sealed, strut members can develop internal corrosion and become weakened. Radiography alone can provide the required nondestructive examination of these internal surfaces. So it has become routine to x-ray these struts as part of the periodic inspection of the planes.

This is but one example of how radiography is proving a boon to the welding process. It is helping to open new fields for the use of welding—especially in the fabrication of highly stressed products and assemblies.

Look into the ways Radiography can aid your business. Your x-ray dealer will be glad to give you full information and assistance.

EASTMAN KODAK COMPANY
X-ray Division, Rochester 4, N. Y.

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another important function of photography

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WINSMITH SPEED REDUCERS

...heart of the drive mechanism

Shooting concrete, castable refractories, acoustical plastics and similar pre-mixed aggregates, in quantities up to 3 cubic yards per hour, is the tough kind of work that this Bondactor machine is cut out for.

. . . and that calls for sturdiness throughout, especially the drive mechanism which bears the real brunt of running under continually heavy loads. Heart of the Bondactor's drive is a Winsmith Vertical Type, Single Reduction, Worm Gear Speed Reducer, driven by an air motor at varying speeds depending on the desired rate of feed.

Says Air Placement Equipment Co., manufacturer of Bondactor: "We started using the Winsmith Reducer about 5 years ago, and because of continual satisfaction, it has been used exclusively on all Bondactor machines."

Like Bondactor, any equipment or machines requiring speed reduction stand to gain noteworthy advantages through the selection of Winsmith Speed Reducers. Fully standardized, thereby simplifying design, installation and replacement problems, the Winsmith line is the most complete within its range of 1/100 to 85 hp and 1.1:1 to 50,000:1 reduction ratios.

Request catalog 148 for details.

WINSMITH, INC.
14 Eaton St.
SPRINGVILLE (Erie County), N. Y.

drum, then inflates the drum with 3 to 10 pounds of air.

Grinders can be used with any kind of power tool for all types of grinding or finishing jobs, according to the manufacturer. Resiliency of this type of grinder is calculated to permit greater abrasive contact area, eliminate chatter and bounce and enable the operator to polish contours more efficiently.

Pump Mounts Standardized

Three types are approved to govern machine tool lubricating and coolant pumps

THREE different ways of mounting machine tool lubricating and coolant pumps are approved by American Standards Association. The new American Standard, B5.28-1952, titled Mounting Dimensions of Lubricating and Coolant Pumps for Machine Tools, contains tables that govern machine tool mounting of pump dimensions.

Adoption of the standard dimensions by pump manufacturers will assure interchangeability only with respect to their assembly to the machine, says ASA. Internal design is left entirely to each manufacturer and will not be affected by standardized mounting dimensions.

Three Methods Covered—Included in the standard are foot bracket and motor-mounted pumps. The foot-mounted units are provided with standard bolt openings at specified locations. Bracket-mounted pumps comprise two types: In type one, the bracket is an integral part of the pump unit, having standard mounting dimensions for assembly to the machine tool. In type two, the bracket is a separate unit provided with standard mounting for assembly to the tool and standard mounting for receiving the pump unit.

Motor-mounted pumps are driven directly by the motor, which serves as a mounting for assembling the pump to the machine tool.

Six Dimension Tables—The six pump mounting dimension tables contained in the standard are as follows: Motor-driven centrifugal pumps (vertical submerged type); mounting bracket (side wall mounting); mounting bracket (top and tank mounting); centrifugal

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Circular Giants

WHOPPER bearings that measure 85 inches on the inside diameter and 93¾ inches outside are used on the 90-millimeter gun mounts of the new Patton M-48 tank. The bearings are made by Kaydon Engineering Corp., Muskegon, Mich.

Production of these bearings hinges on the Kaydon deep-flame-hardening process. It permits integral gears to be cut on the raceways, and drilled and tapped holes to be spaced accurately. This work is done after hardening.

and geared pumps (motor foot-mounting type); centrifugal pumps (flanged mounted type); gear and vane pumps (foot-mounted).

American Society of Mechanical Engineers, National Machine Tool Builders Association, Society of Automotive Engineers and the Metal Cutting Tool Institute sponsored development of the standard under ASA procedures. A. William Meyer, director of research, Brown & Sharpe Mfg. Co., headed ASA's technical committee in its work on the project.

Drill Hits 500 Parts per Hour

Drilling seven holes in an aluminum part at a rate of 500 parts per hour is the record of a new machine built by the Govro-Nelson Co., Detroit.

Operator loads the part and touches the start button. Part is then automatically clamped, drilled and unclamped. Five radial and two parallel holes are drilled simultaneously on this machine. By varying position of the drilling units, the machine can readily be adapted to other drilling operations.

Turbine Runs at 1100° F

Production of a turbine to operate on steam at 1100° F, believed to be the highest steam temperature ever used in a turbine-generator, was announced recently by Turbine Division, General Electric Co., Schenectady, N. Y.

The unit, built for the Kearny generating station of Public Service Electric and Gas Co. of Newark, is the first of two 145,000 kw

Engineered

Pallet type "Walkie" truck 4000 to 6000 lb. capacity.

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*Custom Built or...
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Whether your materials handling job requires special applications or is adaptable to standard models, the cost is relatively the same.

Our Engineers will welcome the opportunity to discuss YOUR particular material handling job . . . Moto-Truc's can be engineered to fit the job. Investigate their "Job application" offer in the economical "Walkie" type lift trucks. Your inquiry will receive prompt attention.

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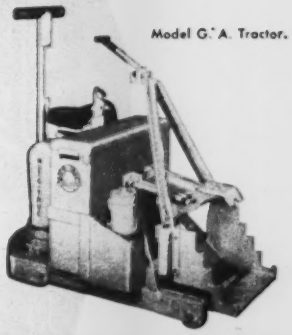
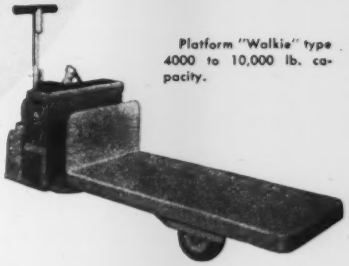


Model G "A" Tractor.

...AT NO EXTRA COST*



Platform "Walkie" type 4000 to 10,000 lb. capacity.

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units ordered by the concern. Stainless steel inner shells are necessary because of the high temperature.

Plastic Tarp Eases Load

CONSIDERABLE wear and tear on maintenance crews should be relieved by a lightweight tarpaulin that simplifies the always awkward task of placing protective covers over machinery and supplies.

The manufacturer, Plastics Division, Canton Containers Inc., Canton, O., says its C-Line poly-

PLASTIC PROTECTION
. . . means faster, easier covering

ethylene tarp offers cost reducing opportunity to plant maintenance work by cutting time required for men to cover material. This results from the extremely light weight—about one-tenth that of fabric tarps of comparable size.

Water-proof, Mildew-proof — Among other characteristics cited for the plastic type is its water-proof and mildew-proof composition. The material is reported pliable in all temperature ranges, is easily washed and dried, and won't absorb paints or liquids. Further opportunity for savings, according to the division, lies in initial cost factor.

High degree of transparency enables crews to identify equipment stored underneath without tearing off the tarp. Further applications include protection where outdoor ground storage is necessary and use by crews for protection when painting, scraping or plastering.

Amid the crashing of forest giants and the chug-chug of burdened tractors, you'll find McKay Chains at work lifting, hauling, holding, rigging and otherwise helping lumbermen move their products to the markets of the world.

McKay Chains have proved themselves in performance, economy and long service life under all work conditions. In every industry, as in lumbering, "There is a McKay Chain for Every Use." No job is too big, none too small.

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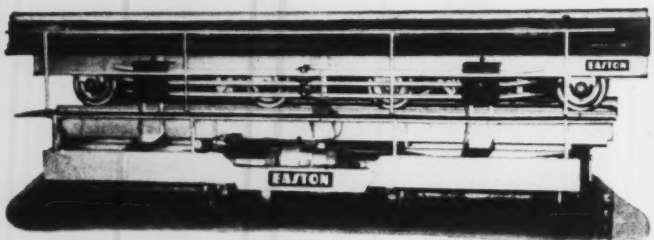

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Drill Sizes Get Smaller

Work in hollow alloy drill steel is meeting a demand for smaller, faster drills

MINING industry is turning to smaller sizes of hollow drill to get speedier drilling. As a result there has developed an increasing requirement for alloy hollow drill steel. This was the report William H. McCormick and Robert W. Persons, Crucible Steel Co. of America made to members of the American Mining Congress recently in Denver.

This trend toward use of alloy hollow drill steel, which started soon after World War II, is a healthy one since alloy steel can do an excellent job of reducing costs by increasing footage drilled, the two steel men told the Congress.

"Fortunately, alloying is taking hollow drill steel out of the hammer and tongs blacksmithing class and making a fine tool of it with careful forging and heat treating," they stated.

Special Study—Mr. McCormick is chief metallurgist of Crucible's Park Works; Mr. Persons, hollow drill steel sales manager for the company. Their paper summarized findings of a special study made by the company on hollow drill requirements of the mining industry.

Given special emphasis was the fact that the mining industry can now use more complex alloys than it did a few years ago because it is equipped with better and more modern tools, better heat treating and tempering furnaces.

In its study Crucible tested drill rods made from over fifty different alloys. Field men, research men and operating people were questioned particularly about fatigue life, wear resistance, straightening problems, forging, cooling after forging, machining and heat treating.

Word of Caution—The engineers caution that there is no one alloy steel rod that will lower drilling costs without any more fuss or bother in fabrication than that used in carbon steel. Each alloy steel rod must prove itself in a particular location, the men stated.

The paper also described a special study covering four general

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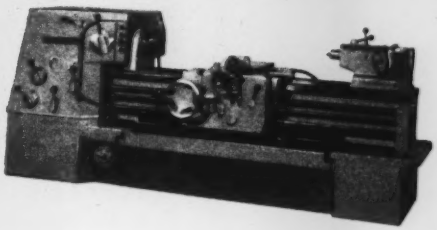
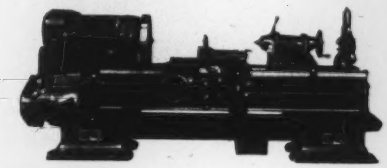
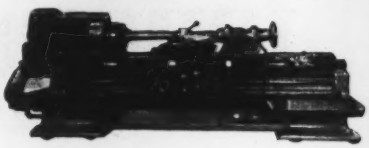
handle a wider range of work—

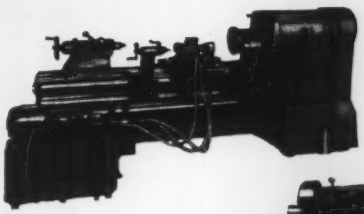
increase output—

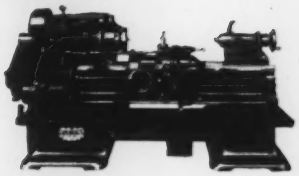
lower operating costs











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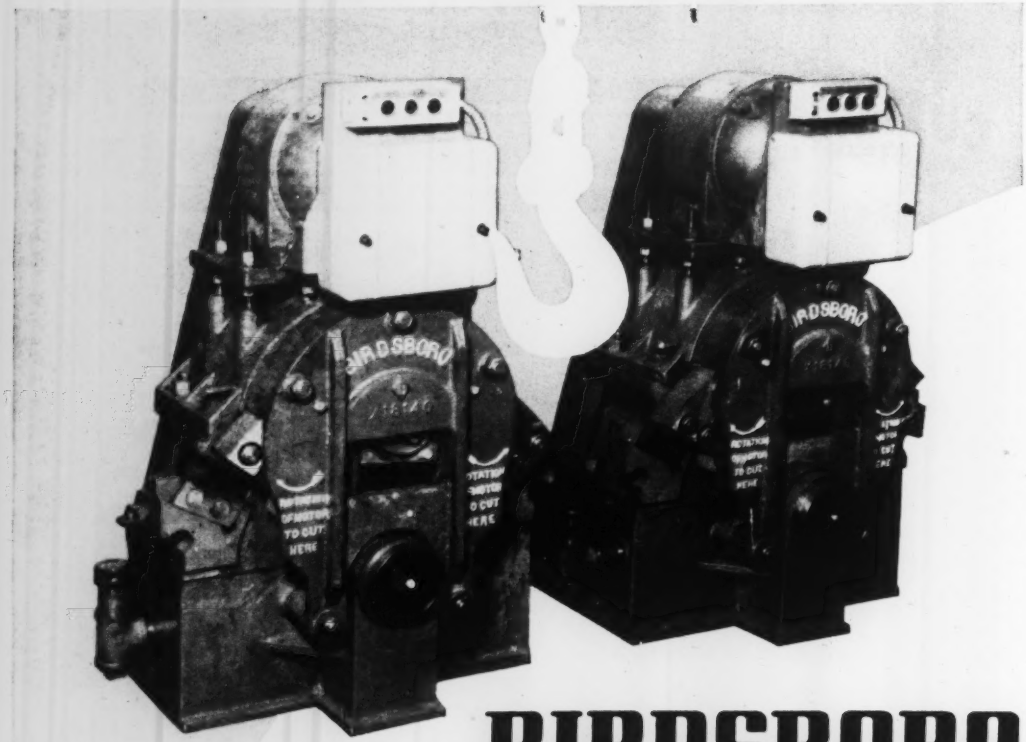


BIRDSBORO

PORTABLE CROP SHEARS

This MOVE Cuts Time and Costs on Steel Cropping

Complete with electric motor drive and starter in a single unit, Birdsboro Portable Crop Shears can be quickly shifted by crane to any location where cropping is required. No need to lose a single bar for lack of shearing facilities at the right point.

These units, for rod and merchant mills, feature the same skill of design and engineering found in all Birdsboro Mill Machinery. They provide easy-to-operate centralized controls . . . fast positive cutting action . . . and performance that pays off in day-after-day profits.

If your mill operations call for cutting split and cold ends off steel bars, there's a time and money-saving advantage for you in Birdsboro Portable Crop Shears. A Birdsboro Engineer will work with you to help you get the results you want.

BIRDSBORO

STEEL FOUNDRY & MACHINE CO.

Birdsboro, Penna.

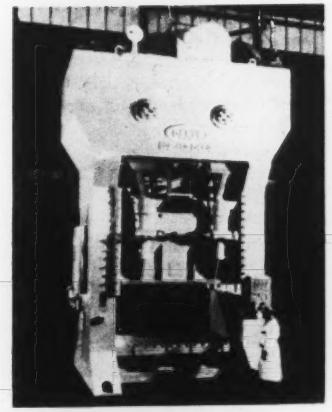
STEEL MILL MACHINERY

Designers and Builders of:

Steel Mill Machinery • Crushing Machinery • Rolls
Hydraulic Presses • Special Machinery • Steel Castings

MM-26-52

Offices in Birdsboro, Pa., and Pittsburgh, Pa.



Variable-Speed Press

New 450-ton double-action straight side press made by Danly Machine Specialties Inc., Chicago., has a dynamatic clutch that varies linear stroking speed during press cycle. Rate reaches 14 strokes per minute. Motor adjustments are provided that regulate both inner and outer slides

types of steel used in hollow drills which has been underway since 1949 and is continuing. The steels, chosen because they had seen sufficient field service to provide accurate data, were the carbon, carbon vanadium, chrome nickel moly type and the high carbon, high chrome, moly type.

Wanted: Substitutes for Rutile

The United States must develop substitutes for rutile in the opinion of the National Production Authority.

Rutile, a reddish-brown sand containing titanium-dioxide, is used in the manufacture of welding-rod coatings, ferro-alloys, aluminum alloys, fibre colors, metallic titanium and chemicals.

American consumption will jump from 19,000 tons in 1951 to about 27,000 tons in 1952. Of that amount, three-fourths will be imported from Australia, the leading world producer. Domestic production is slim although there are known untapped deposits.

NPA fears that an emergency stoppage of rutile imports would jolt American industry and defense plans. The Army uses rutile in production of heavy tanks; the Air Force uses the mineral in jet en-

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If abrasive cutting is already a production function in your plant . . . or if you're just considering its possibilities . . . you will want a copy of the NEW Allison Catalog. Information on both wet and dry cutting of various materials . . information on abrasive cutting machines and their maintenance . . . recommendations for the selection of Allison Abrasive Wheels . . . written by *specialists in abrasive cutting for over 30 years!* Send coupon today . . . your copy will be mailed promptly.

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ABRASIVE CUTTING WHEELS

THE TOUGHER THE CUTTING JOB . . .
THE BETTER THE OPPORTUNITY FOR
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BALSI

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255 Island Brook Ave., Bridgeport 8, Conn.
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gines, and the Navy needs rutile for shipbuilding.

NPA hopes to solve the problem by increasing production of substitute minerals such as brookite, which is mined in limited quantities in Arkansas, and tanarc, made from slag.

Pioneers in Brass

From 10 to 30,000 pounds per hour 150 years of progress in brass casting will be shown visitors at Scovill Mfg. Co.'s booth at the National Metal Exposition.

Live demonstration of the early 1800 brass casting method will be compared to Scovill's continuous Flat-Metal casting machine, said to be the only one of its kind in the brass industry. Also exhibited will be a huge continuous-cast coil, in motion on a coil winder and unwinder.

Washer Boosts Recovery

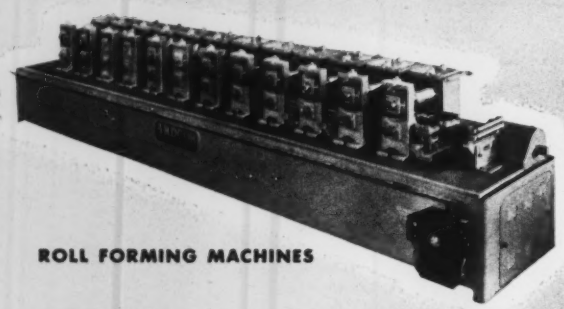
New gas washing installation at Donora Works, American Steel & Wire Div., U. S. Steel Corp., performs two functions. First, it will provide a cleaner atmosphere in Donora and second, it will help recover a large amount of steelmaking raw material.

Company estimates the new equipment will recover four times as much flue dust as the former facilities.

Water sprays will douse 120,000 cubic feet of gas per minute from the plant's blast furnaces. Captured dust will be pumped to a settling tank to be collected as a watery sludge. Water will then be filtered off leaving the dust caked into usable form for sintering.

ARDCOR *Engineered*

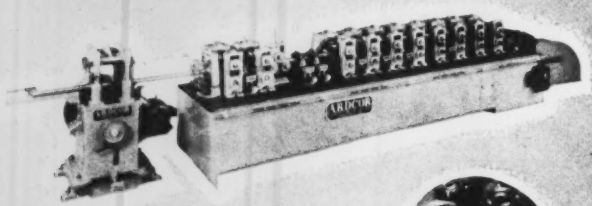
MEANS BETTER COLD-ROLL FORMING



ROLL FORMING MACHINES

PUNCH TYPE CUT-OFFS

LOCK SEAM TUBE MILLS



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Text Covers Stainless Welding

"Welding with Stainless Steel Electrodes," a 32 page booklet, covers welding of chromium-nickel steels, with and without molybdenum, as well as welding of straight chromium steels. It also contains analysis of most types of such steels, giving AWS and ASTM classifications of corrosion resisting electrodes.

The booklet is published by Lincoln Electric Co., Cleveland 17, and is available at 25 cents per copy.

AIEE Hears Ion Exchange Role

Demineralization of boiler feedwater through a process of ion exchange was given as the solution of a major problem of affecting high pressure, high temperature systems at the fall meeting of American Institute of Chemical Engineers in Chicago.

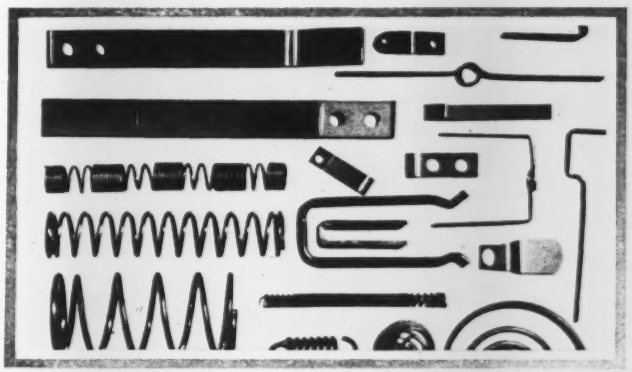
Martin E. Gilwood, director of research for Permutit Co., New York, described the new development, an automatically regenerated mixed bed demineralizer, that produces water low in electrolyte and dissolved silica through the medium of ion exchange.

Tool Firms Exhibit Wares

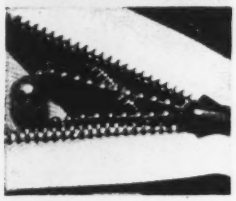
Representatives of 700 machine tool firms from 10 countries displayed their products at an international exhibition of machine tools in London. Countries having exhibits at the show were Britain, the U. S., West Germany, Switzerland, Italy, France, Belgium, Swed-

SEYMOUR PHOSPHOR BRONZE

THE METAL THAT RETAINS ITS RESILIENCE FOR YEARS AND YEARS AND YEARS

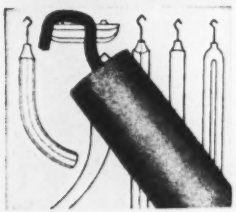


NICKEL SILVER



An alloy of copper, nickel and zinc. Silvery white, the perfect basis for flatware. Capable of a wide range of ductilities, therefore ideal for deep draws without anneals.

NICKEL ANODES



Seymour Nickel Anodes give even deposit with minimum sludge because the grain is precision-controlled during the melt, and each melt has laboratory supervision. Use them with Seymour Bright Nickel Bath wherever time is money!

Ever since it was discovered, years ago, that a mere fraction of a percent of phosphorus in a melt of copper-tin bronze made it extremely tough, resilient and corrosion-resistant, *phosphor bronze* has been the "wonder metal" in industry.

Seymour Phosphor Bronze, in which these properties have been developed to a high point, is universally used for contact springs in electric snap switches, because such springs will "snap" hundreds of thousands of times without failure. This performance, plus the ability to function in salt air and gas-laden surroundings, makes Seymour Phosphor Bronze highly valuable elsewhere in industry.

If you have a problem Seymour Phosphor Bronze might solve, our engineers are at your service, or we will send you samples for test. Made in sheet, wire and rod.

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SEYMOUR, CONN.

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eye protection

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Willson goggles offer you greatest value because they are carefully designed for comfort and appearance as well as for the eye protection you need. Choose from a wide range of Cup and Cover-All® types like those illustrated. All are fitted with Super-Tough® heat-treated glass lenses—all fully pre-tested. You're *sure* when you ask for Willson goggles—*safer* when you wear them.

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Heavy duty goggles allowing plenty of room for prescription glasses to be worn safely and comfortably.

RUBBER MASK GOGGLE No. X41

Ideal for chemical workers. Rolled inner edge makes them fit snugly with utmost ease.

STYLE DL31

Deep perforated metal cups provide direct ventilation yet exclude dust. Ideal for use in hot, dusty atmospheres.

See your WILLSON distributor or write for bulletin

WILLSON PRODUCTS, Inc., 233 Washington St., Reading, Pennsylvania

Nation on Wheels

HERE ARE some figures gleaned from the 1952 edition of *Automobile Facts and Figures*, annual publication of Automobile Manufacturers Association.

About one third of every dollar paid for a new car goes to local, state and federal tax collectors.

The U. S. has 76 per cent of the passenger cars in the world.

In 1951 the average car was 7.1 years old.

Factory sales of motor vehicles in the U. S. declined more than a million units last year.

Motor vehicles in the U. S. traveled a record 482 billion miles last year, a 45 per cent increase over 1941. In 1951 we consumed 38 billion gallons of gasoline. That's a national average of about 12.7 miles per gallon.

Almost two thirds of the U. S. families own cars, there being a car for every four persons in the country.

en, Denmark, the Netherlands and Austria.

Britain had the largest number of booths with 651. West German concerns, exhibiting for the first time since the war, had 243. The U. S. had 93.

U.S. Sees German Miller

Table sizes up to 80 x 20 inches, table movement accurate within 0.0004-inch and simple single-lever control are among advantages cited in a Nube vertical milling machine built in Germany and distributed by Kurt Orban Co. Inc., New York.

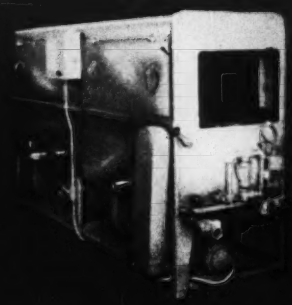
Saddle bedways are the same length as those of the table, resulting in high degree of accuracy even when working at extreme ends. Machines are rugged enough to permit the heaviest cuts. A heavy ribbed knee design assures vibrationless performance.

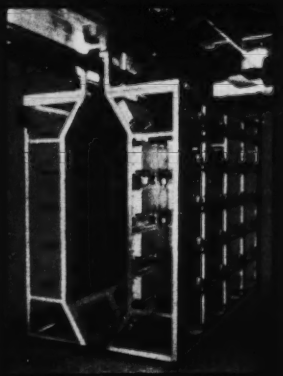
Iron Founders Meet Oct. 16-17

Twenty-fourth annual meeting and convention of the Gray Iron Founders' Society Inc. will be held in Cleveland on October 16-17.

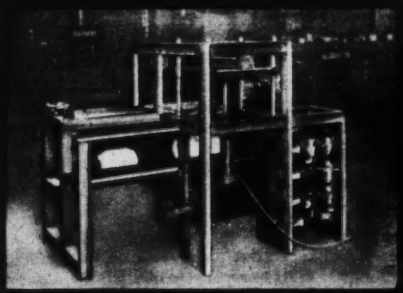
Featured on the two-day agenda are Carl Taylor, president of the

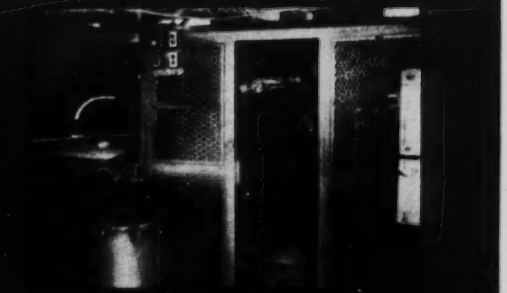
Aimed for Tomorrow's Needs





You know us today as one of the largest manufacturers of paint finishing equipment—major suppliers to the exacting demands of the Automotive Industry. Our production and engineering developments in the metal fabricating field encompass, in addition to Paint Spray Booths and Drying and Baking Ovens, Dust Collecting Systems and Industrial Washing Equipment. Working as we have in these fields, our development engineers are *now* readying for production *new* products made possible by their past and present meeting of equipment problems for industry. Illustrated on this page are some of these important new products . . . perhaps you would be interested in further details.





Peters-Dalton Inc.

1 **BONDERIZED STEEL FRAMES,** braze welded with ANACONDA-997 Bronze Rod, make the famous "Rusco" metal combination screen and storm sash. Foreman Jack Hollister points out brazed frame corner.

Production Story:

1,000,000 windows a year

Ingenuity, modern techniques, and good welding rod help F. C. Russell Co. braze weld 100 metal windows an hour.

2 **GOOD-FLOWING BRONZE ROD,** such as ANACONDA-997, is needed to run the braze metal into a groove .300" deep to hold screening in place. Each corner is brazed and the fillet is run right up to the edge of the section.

3 **SPECIAL WELDING FIXTURES,** shown in close-up, developed by "Rusco" engineers, facilitate rapid brazing of their windows. So does ANACONDA-997 Bronze Rod. It "tins" readily. The work stays clean, is easily finished

4 **LOW FUMING CHARACTERISTICS** of ANACONDA-997 Bronze Rod allow welders like John Jenkins to work in comfort full time. Here he brazes handles on screen inserts for the windows. Weld quality comes first; speed next.

F. C. Russell Co., Cleveland, Ohio is a large multi-plant organization turning out more than a million metal windows a year. Production efficiency is boosted with ANACONDA-997 (Low Fuming) Bronze Welding Rod.

ANACONDA 997 Welding Rod is widely used for joining copper alloys, cast iron, malleable iron, steel and nickel alloys by oxyacetylene braze welding. It is ideal for repair-welding all types of industrial machinery and equipment. It is also used to deposit bearing surfaces.

Perhaps the Russell *"success story"* can be applied to your business. Whether your production is large or small, there is likely to be an ANACONDA Welding Rod for your purpose. They are sold by distributors throughout the United States.

For full information about ANACONDA Welding Rods and the latest welding techniques, write for Publication B-13. The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

52178

braze or weld with confidence

ANACONDA®

welding rods

ANACONDA

Waukesha State Bank, Waukesha, Wis., Dr. George Taylor, Professor of Labor Relations at the University of Pennsylvania, and W. T. Bean Jr., research consultant and design engineer. Convention headquarters will be Hotel Cleveland.

Dividing Head Ordered

Optical head gives 3-second accuracy. It's for machining jet engine components

OPTICAL DIVIDING head with a face plate capacity of over 48 inches has been ordered from the F. T. Griswold Mfg. Co., Devon, Pa. Company placing the order is an automotive manufacturer.

With the new head it will be possible to locate and make settings to an accuracy of 3 seconds for machining large jet engine components. It repeats settings in either direction and the base of the dividing head is designed so it can be set up for either smaller or greater swing as required.

Free Index—Basic design will permit the manufacturer to obtain fast and error free indexing and a more accurate method of aligning than with mechanical means. Positioning is rapid, no calculations or reference tables are required and effects of gear wear, backlash and oil film thickness are eliminated. The housing maintains alignment even under heavy loads.

Settings will be entirely by optical means. A circular scale on which degree lines are etched, from 0 to 359 degrees, is illuminated and lines are magnified and projected onto a ground glass screen. Minutes and seconds are on a circular dial marked in 15 second divisions and degrees are aligned between reference marks on the screen. Direct visual reading is obtained, no focusing is required and the operator can quickly sense any unbalance between reference lines.

Soil Pipe Specs Planned

Savings in construction costs should result from new fitting weight specifications to be presented at the meeting of the Cast Iron Soil Pipe Institute's annual meeting in Atlantic City, Oct. 17-18.

At request of the National Asso-

MATERIAL PROBLEM?

Then Specify FELT

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You can ask us to make your FELT as soft as a beautiful hat... or as hard as a rugged gasket...

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And talk about COLOR! FELTERS FELT is made in any color or shade from midnight black to hospital white...

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Call us when you need FELT in rolls, strips, by the square yard or in precision cut parts.

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Manufacturers of Unisorb for Machine Mounting

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Gentlemen: Please send me details on Felters Felt and Felters Precision Cut Felt Parts. I have the following material problem:

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Name & Title .....

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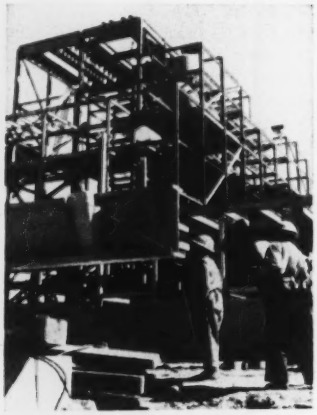
ROUND CALIFORNIA CHAIN CO.— an important link in the nationwide Round Chain organization — is under the direction of J. D. Cavan, a Round veteran of 15 years. Like all other Round Chain Companies, Round California supplies a *complete line* of welded and weldless chain, slings, chain hoists, electric hoists, trolleys and winches. *Sold exclusively through wholesalers and distributors.*

J. D. CAVAN



Power for Los Angeles

This steel skeleton rising out of San Fernando valley will house a generator plant capable of delivering 200,000-kwh for Los Angeles Department of Water & Power. Fabrication of 1641 tons of structural steel is nearing completion by U.S. Steel's Consolidated Western Steel Division

ciation of Master Plumbers, the institute sponsored specifications for two weights of soil pipe and fittings. The change involves expenditures for new patterns by every manufacturer in the fittings field.

Standards for Felt

Felt that you use for buffing wheels, vibration mountings, dust shields, grease and oil shields, washers, gaskets and liners is now included in a standards program set up by the Felt Association, New York.

Program establishes standard methods of test, rating, certification and labeling of wool felt, and provides uniform bases for fair competition. Adherence to the plan is voluntary, but reference can be made to it in contracts, labels and invoices.

To date over 100 manufacturers and organizations have announced acceptance of the new standard.

Pocket Tables Cut Calculation

Calculations that eat up important job time are cut to a minimum with publication of a 144-page pocket-size booklet of industrial tolerance tables. Both deci-

OILITE Finished Machine PARTS Assure YOU

- ★ No Tooling on Your Part.
- ★ Fast Delivery (Normally two (2) to six (6) weeks).
- ★ Accurate Parts (Machine Tool Tolerances).
- ★ Low Cost (Less than Machined Parts).
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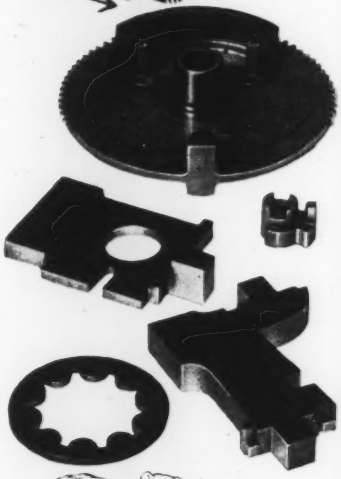
- ★ Greater Freedom in Design.
- ★ Broad Range as to Size and Materials.
- ★ Consultation with Field Engineers.
- ★ The Benefit of More than Twenty (20) Years of Powder Metallurgy "KNOW-HOW."



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AMPLEX MANUFACTURING COMPANY

Subsidiary of Chrysler Corporation

Detroit 31, Michigan

FIELD ENGINEERS AND DEPOTS THROUGHOUT UNITED STATES AND CANADA

Oilite Products Include: Bearings, Finished Machine Parts, Cored and Solid Bars, Permanent Filters and Special Units.

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mal and fractional equivalents are provided.

A localizer chart eliminates errors in reading by blocking out all but the desired figures. Copies are available at $2 each through Handy Length Book Co., 3507 17th St. S.W., Canton, O.

Jacks: Enough for Defense

Manufacturers of jacks say they have enough productive capacity for present military and defense-supporting needs. The industry would have to acquire new machinery only if a sudden demand arises for bomber wing jacks or other specialized equipment, says the Jack Industry Advisory Committee.

Sales in 1953 will probably not differ much from this year, the committee told officials of the National Production Authority. Order backlogs have fallen off as much as 50 per cent in some cases, as jobbers and distributors are reluctant to build up large inventories. One committee member said that the industry already has entered a buyer's market.

Members criticized NPA's 30-day inventory restrictions on steel. They claimed that it is almost imposible to stay within the 30-day provision. The committee requested a 60-day inventory period.

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VALVES, FITTINGS and FUNCTIONAL ASSEMBLIES

Machined Forgings, Extrusions, Castings to exacting customer specifications. . . . For defense production or essential civilian requirements.

BRASS

GOT A PROBLEM? Our field engineers and home office Research and Development department will be happy to work with you with no obligation of course.

DEFENSE—Producers and Suppliers of Ammunition Components for U. S. Army Ordnance . . . Valves and Fittings for U. S. Navy, U. S. Army Air Force, U. S. Maritime Commission and other agencies demanding *Top Brass*, precision-made components.

CIVILIAN—Producers and Suppliers of Valves, Fittings and other components for the following industries: Air Conditioning • Automotive • Diesel Engines • Farm Equipment • Gas Appliances • Oil Refining and Heating • Plumbing • Refrigeration.

DETROIT BRASS & MALLEABLE CO.
SPECIALTIES DIVISION
DETROIT 9, MICHIGAN

AT YOUR SERVICE IN THE NATIONAL EMERGENCY

Time Cut by Trepanning

Triple-edged cutter mounted on a trepanning head cuts job time and saves core for future use

PRODUCTION increases as high as 1000 per cent are reported on some trepanning jobs by Kennametal Inc., Latrobe, Pa.

Forged steel line shafts, $9\frac{3}{4}$-inch diameter by 30 feet long, are trepanned with cemented tungsten carbide triple edge tool mounted in a $4\frac{1}{2}$-inch diameter trepanning head. Operating at 250 rpm and 0.006-inch feed, this tool cuts a $4\frac{1}{2}$-inch diameter hole through the workpiece at 8 feet per hour.

From Both Ends—The 30-foot line shaft is bored half way through, then reversed and bored from the other end. After each 15-foot penetration, the trepanning tool is reground to assure smooth performance with longest tool life.

Three cutting edges of the $\frac{3}{4}$-inch wide tool divide the chip into three sections which are curled and broken up by parallel chip-breakers for easy disposal.

Heretofore this operation was done with a high speed steel spade drill in 90 hours floor-to-floor time. With the triple edge trepanning tool, time is now only eight hours.

Saves Core—In another instance, forged steel rolls up to 28 inches in diameter and 46 feet long, are trepanned with a cemented tungsten carbide triple edge tool mounted in a trepanning head.

With this tool cutting at 200 surface feet per minute and 0.008-inch feed, a 24-inch diameter hole is trepanned through the 46-foot long line shaft with ease. In both the above instances, cores are then used for smaller diameter parts, thus providing a worthwhile savings in essential material.

Cuts Time — This operation, which heretofore required 250 hours machining time with high

. . . and why it saved plenty to find out

These are "invisible" cracks in a casting. They were discovered and made visible in rough state by inspection with Zyglo, one of Magnaflux' many methods used to detect defects.

If these cracks occured in just one piece, it wouldn't be so important. But if they happen in 1,000—or 100,000—that's different. If the defects aren't found until *after* machining, it's costly. Early detection prevents an exorbitant waste of material, time, manpower and profits!

This looking beyond *effect* to find *cause* and *correction,* is what we at Magnaflux mean by process control. No matter what *you* make—or what materials you work with—the chances are that one or another of our methods can help you reduce costs by finding defects and correcting their cause at the most economical stage of production.

Manufacturers of everything from dishes to diesel locomotives are profiting through such use of Magnaflux' Methods. They include some of the foremost and most efficient producers in the world! One of them says, "It's just common sense". . . and another that "It's trading dimes for dollars."

Why not find out right now what process control through Magnaflux' Methods can do for *you?* There's an interesting new Bulletin on the subject that we'll be glad to send you if you'll mail the coupon.

MAGNAFLUX' INSPECTION METHODS

available for—

Detecting defects in magnetic and nonmagnetic metals . . . ceramics . . . glass . . . plastics . . . powdered metals

Stress measurement and analysis

Rapid thickness measurements from one side only

High-speed quantitative and qualitative measurement and evaluation of parts, materials and assortments

MAGNAFLUX DETECTS DEFECTS

MAGNAFLUX CORPORATION

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Reg. U.S. Pat. Office

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5912 Northwest Highway, Chicago 31, Illinois

Please send me a copy of your bulletin on profitable process control through Magnaflux' Methods.

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City ..... *Zone* *State* .....

FROM THE VIEWPOINT of operations, costs, and management, National Rolls are a long term investment in roll satisfaction. They turn out top quality work at low cost per ton. The care and precision that go into their manufacture are directly reflected in their dependable performance in the stands. Try them and see.

THE NATIONAL ROLL & FOUNDRY COMPANY
Avonmore, Pennsylvania

SPECIALISTS IN IRON AND ALLOY IRON ROLLS AND CASTINGS

Stainless Turbine Repairs

A workman spray-welds metal to a turbine bearing shaft while the turbine, measuring 24 feet long by 24 feet diameter turns slowly on its custom-made lathe. The 58-ton stainless unit was mounted on the lathe for repairs. In operation, it works with three other units to supply power to Ford Motor Co.'s River Rouge, Mich., plant

speed steel tools, is now performed in only 54 hours with a Kennametal trepanning tool.

Outside diameter of the steel roll is turned on another lathe prior to setting up for the trepanning operation on the converted 48-inch Niles lathe. To handle such long rolls it was necessary to extend the lathe bed and install a 40-horsepower motor. Rolls are bored halfway through, reversed and bored from the other end. The two holes meet at the center with negligible runout.

Tools are touched up after each penetration regardless of condition to assure longer life and smoother performance. Boring halfway through these large rolls represent over forty miles of lineal cutting per grind.

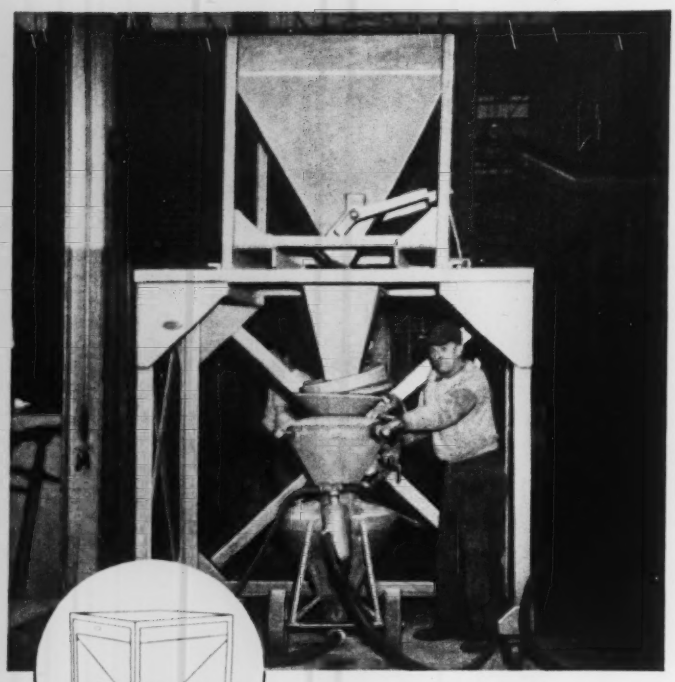
Crawlers Get Fluid Drive

Smoother break-away performance and load handling by throttle are advantages cited for a fluid torque drive recently made standard on all Unit Crane & Shovel Corp. ½-yard crawler and mobile machines.

The company reports field testing as a shovel, trenchoe, clamshell, dragline and all other op-

● Why limit the design of your products to an ordinary fastener? When you order Circle Ⓑ bolts, specially designed for your job, you can produce a better product...often at a saving. Let us work out your fastener problems. You'll save time and money...as well as headaches.

● For all of your fastener requirements, you'll find our new NO. 51 catalog a real help in specifying and ordering. Let us send you a copy.



Specially designed hopper bucket makes cupola lining more efficient. Bucket is placed on frame by use of a lift truck.

Solve Your Material Handling Problems With PENN IRON SPECIAL EQUIPMENT

In lining cupolas, Textile Machine Works foundry in Reading, Pennsylvania, had difficulty handling the clay mix used with their Bondactor equipment. After a study of the problem, Penn Iron Works, Inc., designed, engineered and manufactured this special hopper bucket for maximum handling efficiency.

Whatever the bulk-material handling problem in your plant, Penn Iron Works, Inc., will be glad to help with its solution. Our wide experience in designing and manufacturing all types of buckets and special handling equipment for foundries can help you cut costs . . . save time . . . increase efficiency.

For Further Information Write:

FEMA

PENN IRON WORKS, INC.
READING, PENNSYLVANIA

erations, show greater work output without increased fuel consumption.

Clamp for Piston Assembly

Exerting up to 15 tons clamping pressure automatic clamp speeds whole procedure

POLISHED chrome-plated steel piston rods are held tight at over 15 tons of clamping pressure to permit fast assembly of piston and followers to the rod. Unusual job is performed by this unique clamping device designed and built by Planet Products Corp., Cincinnati, in conjunction with Miller Motor Co., Chicago.

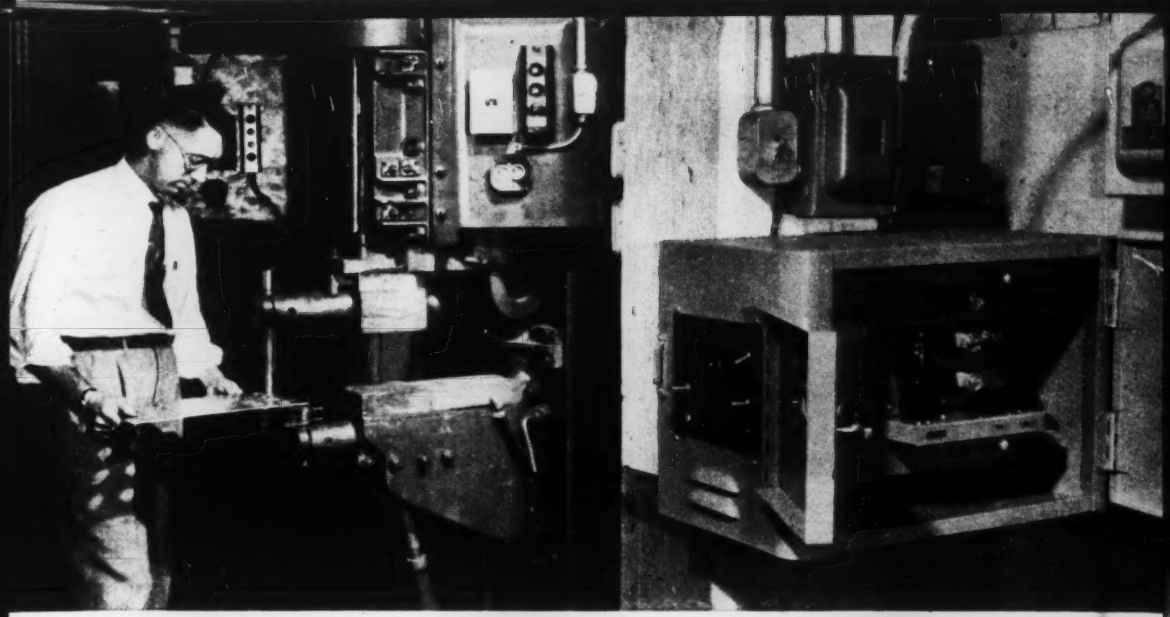
A small hydraulic pump operating at 250 psi powers the entire device. The 15 tons clamping pressure is obtained with a standard 5-inch bore fluid pressure booster with a booster ratio of 6.25 to 1. Booster drives a Miller high-pressure hydraulic cylinder, the piston rod operating the movable clamping member.

One Unit—Booster and cylinder are assembled integrally as a single compact unit with no high pressure piping used between them. Brass V-jaws on the clamp prevent marring of the polished rod under the clamping pressure developed.

A feature of the device is the tightening adapter for piston and follower assembly. This adapter is hinged to swing away from or toward the clamped rod. It contains a circular tightening disk that turns clockwise or counterclockwise as desired by ratchet action of two small-bore hydraulic cylinders operating at 250 psi pump pressure. One is mounted at top, the other at bottom of the adapter.

Mates—Into the face of this disk are holes spaced for receiving steel pins that protrude at right angles to disk face and lock into tightening holes in piston follower. With rod held tightly by clamp, the piston-follower assembly is placed on rod lightly by hand. The tightening adapter is then swung into position with pins in the revolving disk holes locking into aligning holes in the last follower. Entire assembly is tightened merely by flicking the switch operating the two small-bore cylinders.

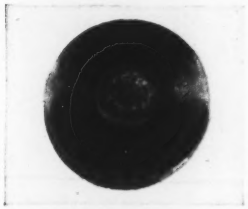
If disassembly is required, the



Laboratory Tests Prove Resistance Welding Aluminum Is Easier with . . .

NEW G-E UP-DOWN SLOPE CONTROL

WITHOUT SLOPE CONTROL



ELECTRODE PICKUP is noticeable on this electrode, used 40 times without Slope Control.

WITH SLOPE CONTROL

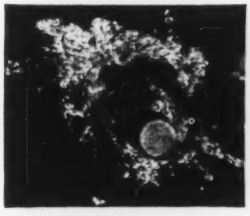
LONGER ELECTRODE LIFE with G-E control. Above used on aluminum 1700 times—no cleaning.

HOW IT WORKS: This new G-E control increases heat input gradually (Up-Slope) to full-heat, reducing tip pickup. After full-value time has elapsed, heat is gradually decreased (Down-Slope), reducing porosity and cracking.

UNIFORM WELD STRENGTH is obtained only with G-E control because precision timing is used at point where Down-Slope starts.

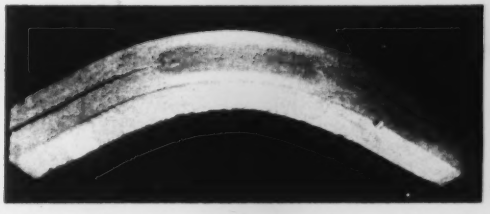
For more information on the complete line of G-E resistance welding control, contact your nearest G-E apparatus sales office. Write Section 645-57 for bulletins GEC-902 and GER-610 on Up-Down Slope Control.

Your resistance welding machine manufacturer or his agent will be glad to help you with resistance welding problems. *General Electric Company, Schenectady, N. Y.*



SEVERE BURNING caused by current surge in welding aluminum without Slope Control.

NO BURNING when G-E Slope panel automatically controls heat input in stud-welding aluminum.

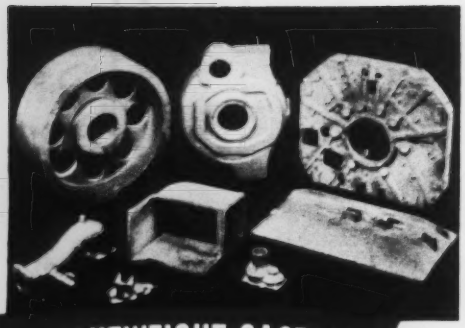


DUCTILE WELDS, such as this aluminum alloy nugget bent 45°, show no cracks because of the tempering effect of gradually decreasing heat input. This means fewer rejects.

RESISTANCE WELDING CONTROL

GENERAL ELECTRIC

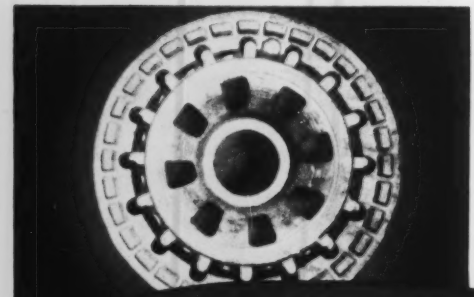
*Well-Cast



COMMERCIAL LIGHTWEIGHT CASTINGS

Your commercial requirements for lightweight castings in aluminum or magnesium may be tough, but we'd welcome an opportunity to look them over. We've tackled a good many diversified casting problems over almost a half century.

Our four completely equipped plants and their trained personnel are at your disposal.



*Well-Cast

MILITARY LIGHTWEIGHT CASTINGS

Aircraft wheels, strut parts, engine parts and miscellaneous components are being made every day at our plants, in aluminum and magnesium. X-Ray inspection, close attention to detail, complete facilities for production in sand, semi-permanent and permanent mold form.

Well-Made Wood and Metal Patterns.
Well-Cast Ampco Bronze Castings.

*Copyrighted Trade Name

If you would like to receive the Wellman Magazine each month without charge, drop us a note on your business letterhead.

THE WELLMAN BRONZE & ALUMINUM CO.

DEPT. 19 12800 SHAKER BLVD., CLEVELAND 20, OHIO

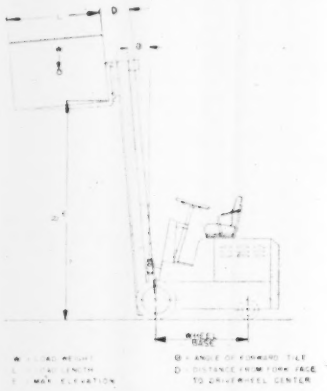
switch is flicked to reverse position, thus loosening the follower holding the assembly together. While this clamping device is specially designed for piston rod assemblies, the booster-operated clamp itself offers advantages in many clamping applications.

Handling Hazards Defined

Premium on fork truck stacking heights overlooks physical laws governing stability

HIGH COSTS of building new or additional storage facilities is making it increasingly important that every materials handling engineer "utilize the cube" to best advantage, says Harold Milz, chief engineer at the Mercury Mfg. Co., Chicago.

The situation places a premium on fork truck stacking heights often without proper regard for



TOTAL OVERTURNING MOMENT
. . . is sum of three others

the hazards or the physical laws governing fork truck stability.

Missing Data — Generally, the fork manufacturer designates the proper truck for the job, based on complete job specifications supplied by the user. Often overlooked in the specifications are the potential stability problems caused by light loads of odd sizes, or when the centers of gravity fall too far forward.

A fork truck carries its load ahead of wheels in cantilever fashion. It can be treated as a simple lever, with the front wheels acting as a fulcrum point between the load and the weight of the truck. The

Mono-Cushion
MOST TRUCKS COME EQUIPPED WITH Mono-Cushions
Steady, floor-hugging, shock absorbing Monarch Mono-Cushions . . . the King of the lift truck tires, gives your trucks efficiency plus. Mono-Cushions float your trucks . . . are easy on drivers, floors and loads. Ask your truck distributor about them!

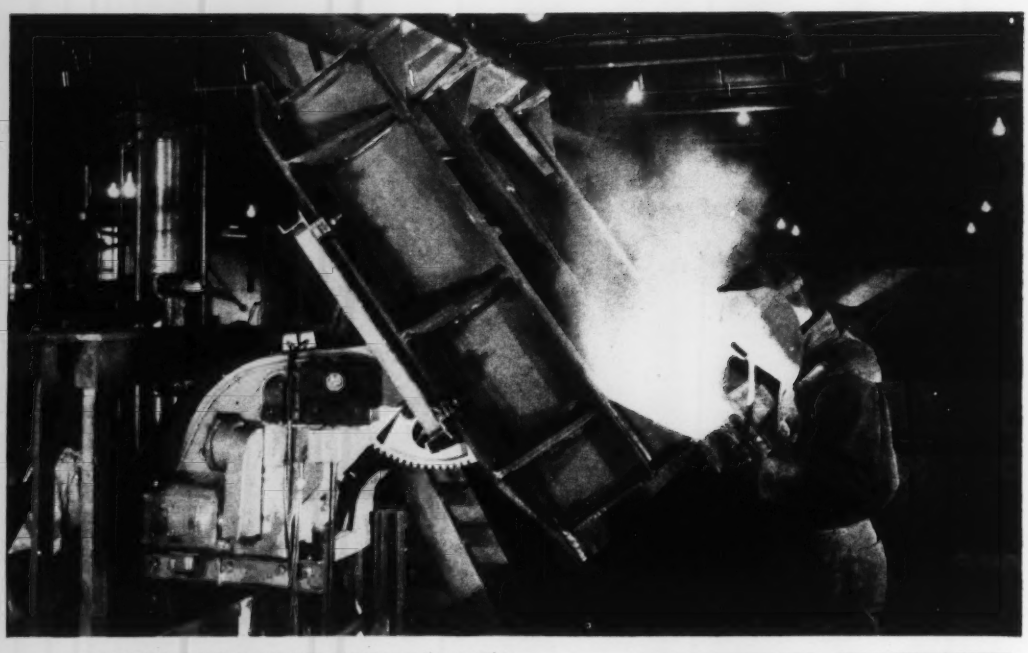
WHEN YOU NEED NEW TIRES FOR YOUR LIFT TRUCKS

Call your truck distributor

● When you entrust your lift truck repairs to your truck distributor, you know the finished repair job will be complete and satisfactory. But, how about new tires? Your truck distributor can re-equip your trucks with tires, too! He knows what's best for your trucks . . . that's why he stocks **Monarch Mono-Cushions.** Place all your truck service under one roof . . . let your truck distributor service them from seat . . . to **Monarch Mono-Cushion** tires . . . the tires that keep your trucks steady.

THE MONARCH RUBBER COMPANY
550 LINCOLN PARK • HARTVILLE, OHIO

SPECIALISTS IN INDUSTRIAL SOLID TIRES AND MOLDED MECHANICAL RUBBER GOODS



WORTHINGTON WELDING POSITIONER ELIMINATES time-wasting handling of the work-piece . . . increases arc-time by tilting the work into position for continuous, economical downhand welding. Capacities from 100 lbs to 30 tons. Also: Turning Rolls from 3 to 150 tons, stationary and self-propelled.

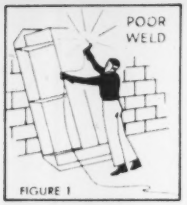
A way to get more and better welding from your welders

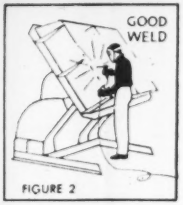
Every minute your welders spend climbing, turning and propping is *lost* welding time.

Turn this waste time into *all arc-time* with Worthington Welding Positioners that tilt or turn all welds into position—*without delay*—for *continuous* downhand automatic or manual welding. Today's labor scarcity makes this increased production more important than ever.

These Positioners lower costs and boost production up to 50%. Downhand welding is *quicker* (only one pass instead of two or three) . . . *better* (deeper penetration with higher current, heavier electrodes, faster deposition of weld metal) . . . *neater* (weld metal levels itself). There's less rod waste, too.

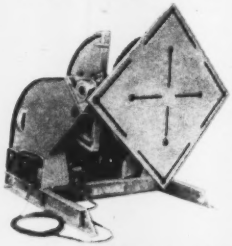
Where can you see a Worthington Welding Positioner at work near you? Just write Worthington Corporation, Plainfield, N. J., for this information or for Bulletin 210D.





HOW WORTHINGTON WELDING POSITIONERS PRODUCE BETTER WELDS

When the welder has to climb over, prop or flop the work-piece, he may only be able to use downhand welding over a limited area (Figure 1). With a Worthington Welding Positioner, the work is continually tilted or rotated automatically into position for downhand welding (Figure 2).



WORTHINGTON'S UNIVERSAL TABLE TOP makes the Welding Positioner as profitable on job work as mass production. Those "T" slots make the table adaptable to any shape of work-piece and a wide range of sizes. No special jigs or fixtures needed.

Y.2.3

WORTHINGTON

Welding Positioners
Turning Rolls

trailing moment of truck weight back of the forward wheels must always be greater than the forward moment of the load weight.

Manueverability Needed — Increasing wheelbase length or counterweight can assure sufficient weight remaining on the trailing wheels, but only at the expense of maneuverability. Design of trucks is thus governed not only by capacity and wheelbase, but by steering effort and stability since steering becomes too difficult for good operation when the trail wheel weight exceeds 7500 pounds, unless power steering is used.

To determine the trail wheel weight which provides adequate stability under all normal operating conditions it is necessary to calculate the overturning moment. This moment is a sum of three other moments which contribute to the overturning tendency of a loaded fork truck . . . Load moment ($W \times L/2$), plus loss moment ($W \times D$), plus tilt moment ($W \times \sin \theta \times E$). Calculations must be made in terms of pounds and inches. Dividing this overturning moment by the truck wheel base gives the amount of weight subtracted from the trailing wheels, when lifting the load.

Since actual use of the truck involves movement of the lifted weight, dynamic forces come into play which must be considered. As these forces are difficult to determine, a simple empirical formula has been developed to take care of them. Figuring an average stacking elevation of 12 feet, the additional trail weight required to offset these forces equals one-tenth of the load weight plus 600 pounds.

Press Speeds Valve Assembly

A multiple-ram assembly press designed to operate in a fully automatic transfer line for assembling a maximum 420 valve guides per hour in an automobile engine has been built by Colonial Broach Co., Detroit.

Red and green indicator lights on the operator's panel show the press fit of each part, whether too loose, satisfactory or too tight. The transfer press is fully automatic, including transfer operations, press operations and inspection.

YOU *Can* AVOID DIE COSTS COMPLETELY

On Your Next STAMPING ORDER

Yes, you can – but it's not *necessarily* the best thing for you.

You want the lowest unit cost – *for the life of the part*, including re-runs. It may well be that our **Machine-Cut Method**, with no die cost, does work out best.

Or, it might better be our **Short Run Method**, using economical blanking dies and stock punches.

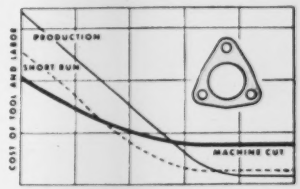
Sometimes, even with very short runs, it pays to use our **Production Method** with a standard die or our own surprisingly inexpensive Hecht-type tool.

In *any* case, the decision is a technical one based on many factors, not just length of run. You save money when the correct decision is made.

WE USE ALL THREE METHODS — LET US MAKE AN IMPARTIAL DECISION FOR YOU

For example, take the part illustrated. From 1-65 parts, our Machine-Cut Method is most economical. At 65 parts, the Short-Run Method is best until, at 7,000 units, the standard Production Method is most satisfactory.

These breaking points as charted vary drastically with every stamping, but the general principle remains the same.



LAMINATED SHIM COMPANY, INC.

Manufacturers of ALL TYPES OF SHIMS

STAMPINGS DIVISION

"ONE PIECE OR ONE MILLION"

STAMPINGS DIVISION, LAMINATED SHIM COMPANY
3410 Union Street, Glenbrook, Conn.

Gentlemen:
Please rush me my free copy of "SERVICE IN STAMPINGS"—the 12-page, illustrated booklet full of helpful facts on the economical buying of stampings.

NAME _____ TITLE _____

COMPANY _____

STREET _____

CITY _____ ZONE _____ STATE _____

Replaces Burned-Off Galvanite

Galvanized surface is burned off galvanized sheet when welded. Metallizing Co. of America, Chicago, has developed a process for recoating the exterior burned area.

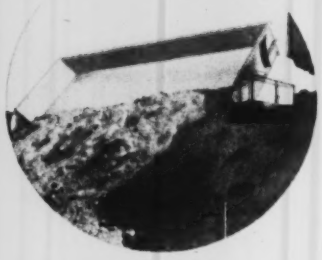
Equipment, which attaches to the forming and butt-welding machine, stops and starts with the equipment and is positive in application.

Speed of replacing the coating is set to conform with the forming and welding equipment. Average is 100 fpm but this can be increased or decreased to correspond to manufacturing speeds.

Heating Book Available

Bulletin on Ther-Monic induction heating facts, used exclusively by the field engineers of Induction Heating Corp., is available to heads of departments of metalworking plants.

Requests for the 25-page booklet should be made on company stationery addressed to Induction Heating Corp., 181 Wythe Ave., Brooklyn, N. Y.



DIFFERENTIAL PRODUCTS INCLUDE:

Locomotives, mine cars, mine supply cars, rock larries, mantrip cars, air dump cars, dumping devices and complete haulage systems.

Over a quarter century ago the first (and original) double-trunnion dump car was placed in service by Differential on the L & N. Sound engineering and careful workmanship were such that this car is still in service — still earning money for its owners.

Such details as hardened, self-lubricating pins in door mechanisms, rolled steel weldments instead of castings (making repairs easier when repairs are necessary)—these are examples of details that put Differential in the lead more than 25 years ago — and keep it there!

Send for Bulletin 56 and get more information on this pioneering air dump car.

DIFFERENTIAL STEEL CAR COMPANY

FINDLAY, OHIO

SINCE 1915 — PIONEERS IN HAULAGE EQUIPMENT

CALENDAR
OF MEETINGS

October 13-17, American Institute of Electrical Engineers: Fall general meeting, New Orleans, La. Institute address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

October 14-16, Society of Industrial Packaging & Materials Handling Engineers: Annual meeting and short course, Chicago Coliseum, Chicago.

October 15-16, Steel Shipping Container Institute: Fall meeting, Pierre & Hampshire House, New York. Institute address: 600 Fifth Ave., New York 10. Secretary: L. B Miller.

October 16-17, Gray Iron Founders' Society Inc.: Annual meeting, Hotel Cleveland, Cleveland. Society address: 210 National City-E. 6th St. Bldg., Cleveland. Secretary: Donald H. Workman.

October 16-18, Foundry Equipment Manufacturers Association: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: Engineers Bldg., Cleveland 14. Secretary: Arthur J. Tuscany.

October 17, American Supply & Machinery Manufacturers Association and National Industrial Distributors Association: Joint regional meeting, Benjamin Franklin Hotel, Philadelphia. ASMMA address: 814 Clark Bldg., Pittsburgh. General manager: R Kennedy Hanson.

October 17-19, Metal Treating Institute: Annual meeting, Hotel Warwick, Philadelphia. Institute address: 271 North Ave., New Rochelle, N. Y.

October 18-19, American Society for Metals: Annual seminar, Benjamin Franklin Hotel, Philadelphia. Society address: 7301 Euclid Ave., Cleveland 3. Secretary: W. H. Eisenman.

October 19-21, Conveyor Equipment Manufacturers Association: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: No. 1 Thomas Circle, Washington 5. Executive vice president: R. C. Sollenberger.

October 19-22, American Institute of Wholesale Plumbing & Heating Associations Inc.: National convention, Chalfonte-Haddon Hall, Atlantic City, N. J. Institute address: 402 Albee Bldg., Washington. Executive secretary: George T. Underwood.

October 20-22, Packaging Institute: Annual meeting, Hotel Commodore, New York. Institute address: 342 Madison Ave., New York 17. Secretary: L. V. Burton.

October 20-24, American Society for Metals: Annual meeting, Benjamin Franklin Hotel, Philadelphia. Society address: 7301 Euclid Ave., Cleveland 3. Secretary: W. H. Eisenman.

October 20-24, American Welding Society: Annual meeting, Bellevue Stratford Hotel, Philadelphia. Society address: 33 W. 39th St., New York 18. Secretary: J. G. Magrath.

October 20-24, Society for Non-Destructive Testing Inc.: Annual meeting, Hotel Sylvania, Philadelphia. Society address: Box 710, Evanston, Ill. Secretary: Philip B Johnson.

October 20-24, American Institute of Mining & Metallurgical Engineers: Fall technical session, Hotel Adelphia, Philadelphia. Institute address: 29 W. 39th St., New York 18 Secretary: Edward H. Roble.

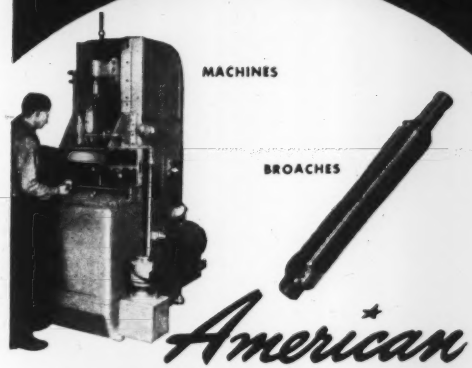
October 20-24, National Metal Congress & Exposition: Convention Hall, Philadelphia. Secretary: W. H. Eisenman, 7301 Euclid Ave., Cleveland 3.

October 20-24, National Safety Council: National safety congress & exposition, Conrad Hilton Hotel, Chicago. Council address: 425 N. Michigan Ave., Chicago 11.

October 22-24, Porcelain Enamel Institute: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Institute address: DuPont Circle Bldg., Washington 6. Secretary: John C. Oliver.

October 22-24, Society of Automotive Engineers: National transportation meeting, William Penn Hotel, Pittsburgh. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

NOW! simplify your broaching problems by dealing with only ONE company . . .



American can fill all your broaching needs

There are three elements in every broaching problem—the machine, the broaches, and the fixtures. To obtain maximum production at lowest cost they must be engineered to work together as a team . . . each designed to get the most from the others.

When your broaching problems are solved the American-way you avoid "piece meal" engineering . . . because American designs and builds all three . . . broaches, machines and fixtures. You get the advantage of engineering and design by men who are *trained* and *experienced* to attack each job as a *complete production problem* . . . not as an isolated piece of equipment. It's easy to obtain information of the *complete* engineering of American Broach. Just send a part-print or sample and hourly requirements. You'll promptly receive our recommendations without obligation. Address Dept. S.

American BROACH & MACHINE CO.
A DIVISION OF SUNDSTRAND MACHINE TOOL CO.
ANN ARBOR, MICHIGAN

this wrench

can slash your costs 3 ways

TAC Open End Ratchet Wrench
(SOCKET TYPE)

delivers incredible savings wherever "tight" situations prevail involving tubing, pipe, conduit, cable or long studs. Saves at least three ways:

1. **CUTS TIME** on production or maintenance operations because it slips around tubing and down fittings, where you ratchet off or on in mere seconds. Functions perfectly with as little as 7° arc clearance for handle. Reduces workman injury too—TAC can't slip off the work and skin up knuckles.
2. **CUTS COST** on fittings, tubing, etc. Snugs down on fittings, never "barks" or scars the hex fitting.
3. **REDUCES INVENTORY OF HAND TOOLS** required in your tool crib. Several sockets, a few head sizes, and you eliminate over *half* the wrenches you'd otherwise maintain.

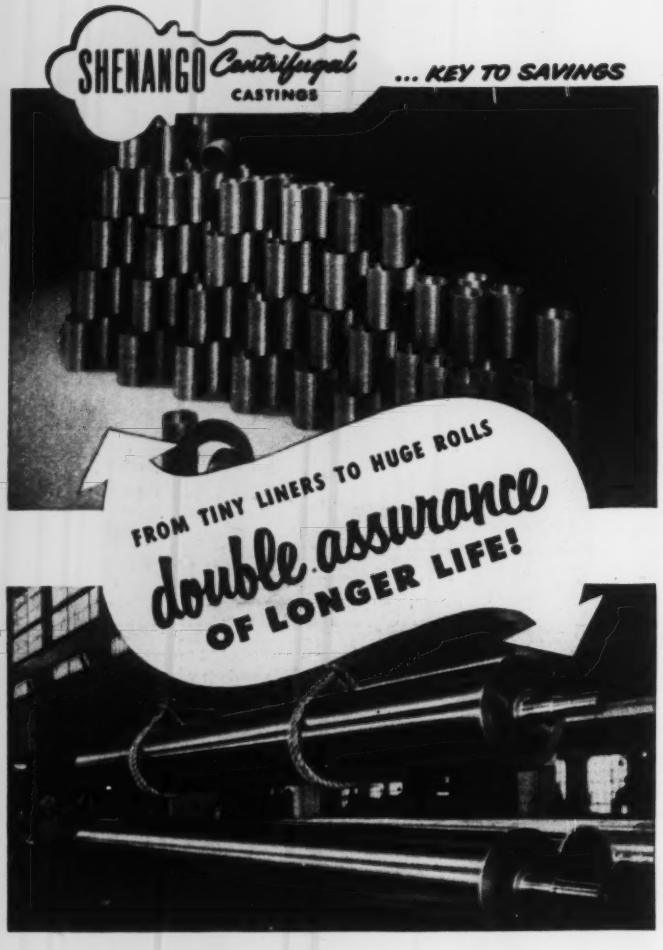
HERE'S HOW IT WORKS!

"BORROW" ONE—PROVE FOR YOURSELF!

Rated companies may request on Letterhead a sample handle, head and socket, for full trial. We ship on memo billing—returnable for full credit. ACT NOW—"BORROW" THIS MIRACLE WRENCH and prove its value!

Send for free catalog

TUBING APPLIANCE COMPANY
10321 Anza Avenue, Los Angeles, California



FOR close-knit strength and added life, here's a combination you just can't beat—Shenango *centrifugally* cast parts of Meehanite Metal. It is *double* assurance of finer, more uniform, pressure-dense metal, plus freedom from blow holes, sand inclusions and other defects!

So check with Shenango on your need for symmetrical or annular parts—semi-finished if you wish, or machined to your precise specifications in the modern Shenango shops. Get *all* the facts. Like others you'll probably find you can save time, money and trouble.

SHENANGO-PENN MOLD COMPANY
Centrifugal Castings Division
Dover, Ohio
Executive Offices: Pittsburgh, Pa.

SHENANGO
ALL RED BRONZES · MANGANESE BRONZES · ALUMINUM BRONZES
MONEL METAL · NI-RESIST · MEEHANITE METAL

October 27-29, National Lubricating Grease Institute: Annual meeting, Edgewater Beach Hotel, Chicago. Institute address: 4638 J. C. Nichols Parkway, Kansas City 2, Mo. Executive secretary: Harry F. Bennetts.

October 27-29, American Gear Manufacturers Association: Fall meeting, Edgewater Beach Hotel, Chicago. Association address: 302 Empire Bldg., Pittsburgh 22. Executive secretary: John C. Sears.

October 27-30, American Gas Association: Annual meeting and exposition, Municipal Auditorium, Atlantic City, N. J. Association address: 420 Lexington Ave., New York 17. Secretary & convention manager: Kurwin R. Hayes.

October 27-31, Electrochemical Society Inc.: Fall meeting, Mt. Royal Hotel, Montreal. Society address: 235 W. 102nd St., New York 25. Secretary: Dr. Henry B. Linford.

October 24-29, Materials Handling Conference: Westinghouse Electric Corp., sponsor, Hotel Statler, Buffalo.

October 30-31, National Association of Aluminum Distributors: Annual convention, Del Monte Lodge, Pebble Beach, Calif.

October 30-November 2, National Tool & Die Manufacturers Association: Annual meeting, Hotel Sheraton, Rochester, N. Y. Association address: 906 Public Square Bldg., Cleveland. Executive secretary: George S. Eaton.

October 31-November 2, Automotive Parts Rebuilders Association: Annual meeting, Conrad Hilton Hotel, Chicago. Association address: 220 S. State St., Chicago 4. Secretary: Jack O'Sullivan.

NOVEMBER

November 3-4, Society of Automotive Engineers: National diesel meeting, Hotel Chase, St. Louis. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

November 5-7, Industrial Management Society: Annual time and motion study, and management clinic, Hotel Sheraton, Chicago. Society address: 35 E. Wacker Drive, Chicago 1.

November 5-9, Scientific Apparatus Makers Association: Mid-year meeting, industrial instrument, laboratory equipment, optical, aeronautical and military instrument sections. The Homestead, Hot Springs, Va. Association address: 20 N. Wacker Drive, Chicago 6. Secretary: Kenneth Anderson.

November 6-7, Society of Automotive Engineers: National fuels and lubricants meeting, The Mayo, Tulsa, Okla. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

November 8, American Society of Tool Engineers, Chicago Chapter: Annual midwestern tool engineering conference, Urbana, Ill. Conference arrangements: Prof. L. E. Doyle, University of Illinois.

November 8-9, Open Steel Flooring Institute Inc.: Fall meeting, The Greenbrier, White Sulphur Springs, W. Va. Institute address: 2311 First National Bank Bldg., Pittsburgh 22. Secretary: Stuart J. Swennson.

November 9-11, Grinding Wheel Institute: Annual meeting, Hotel Claridge, Atlantic City. Institute address: 2130 Keith Bldg., Cleveland 15. Manager: F. A. Peterson.

November 9-11, Abrasive Grain Association: Annual meeting, Hotel Claridge, Atlantic City. Institute address: 2130 Keith Bldg., Cleveland 15. Manager: F. A. Peterson.

November 10-11, The Magnesium Association: Annual meeting and exhibit, Hotel Biltmore, New York. Association address: 122 E. 42nd St., New York 17. Assistant secretary: (Miss) Martha I. Hansen.

November 10-13, The Wire Association: Annual meeting, Hotel Carter, Cleveland. Association address: 453 Main St., Stamford, Conn. Executive secretary: Richard E. Brown.

November 10-14, National Electrical Manufacturers Association: Annual meeting, Haddon Hall, Atlantic City, N. J. Association address: 155 E. 44th St., New York 17. Secretary: W. J. Donald.

November 14, American Iron & Steel Institute: Regional technical meeting, Hotel Mark Hopkins, San Francisco. Institute address: 350 Fifth Ave., New York 1. Meeting director: Frank Ragland.

November 19, American Standards Association: Annual meeting, Waldorf-Astoria Hotel, New York. Association address: 70 E. 45th St., New York 17. Secretary: G. F. Hussey Jr.

SAVES $5,000 YEARLY ON STEEL COST

Unloading Time Cut 2 Hours Per Railroad Car

5-ton, 3-runway, 50-ft. span, completely motorized Cleveland Tramrail bridge operated by pushbuttons from floor. Bridge is shown interlocked with track extending out doorway over railroad. This Tramrail system has been in service since 1943.

A handsome dividend is being earned by the Kortick Manufacturing Co., San Francisco, Calif., on its Tramrail transfer bridge installation.

Because the bridge is of 5 tons capacity, the rods, bars and angle iron which Kortick uses for the manufacture of pole line hardware, can be bought and handled in 5-ton bundles. This eliminates a bundling charge made for smaller bundles. The savings is $2.00 per ton. As Kortick takes in an average of 200 tons per month, the monthly saving amounts to $400.

The bridge interlocks with an outside Tramrail track that extends over a railroad track. This enables the hoist carrier to deliver steel directly from railroad cars to any point inside the building served by the bridge. Because of this feature and the fact that heavier bundles are handled, a saving of about 2 hours unloading time is made per 50-ton car of steel, over their former method which employed a 3-ton hoist.

Obviously with total savings running in the neighborhood of $5,000 yearly, it did not take long for this Tramrail installation to pay for itself.

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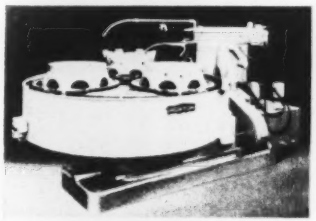
UNITED STATES STEEL

Single-Face Lapping Machine

. . . surfaces are freed from grit

Machine equipped with a 60-inch diameter segmental-type bonded abrasive lap produces a clean, finished surface free from grit on soft large metal parts. Clean surface makes an immediate cleansing of parts after lapping unnecessary. Another advantage is provided by the bonded abrasive lap,



producing bright surfaces that require no subsequent polishing operation.

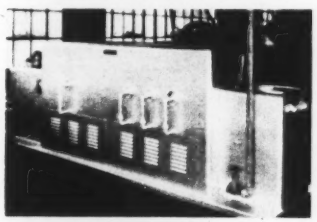
Accuracy of the product is controlled by the truing device. Original accuracy is maintained throughout lap life by a simple diamond truing operation at infrequent intervals. Norton Co., Dept. ST, Worcester 6, Mass.

USE REPLY CARD—CIRCLE No. 1

Continuous Annealing Furnace

. . . anneals brass between draws

Continuous annealing furnace, gas-fired by eight burners with individual mixers, is made for annealing brass stampings between



draws. Combustion blower, control valve, gas regulator and variable drive mechanism are mounted within the casing. To drive the furnace, the small, rubber-tired wheel presses the belt against a large ball-bearing mounted idler pulley. Temperature control instrument at left on the loading section.

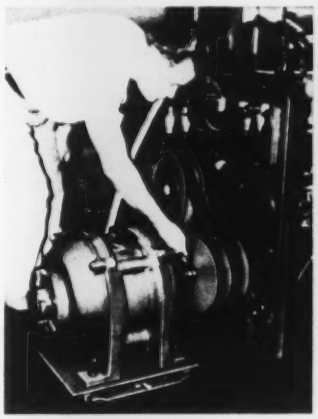
This type furnace can be built in a variety of sizes in either open-fired or controlled atmosphere, full muffler types. Waltz Furnace Co., Dept. ST, 1901 Symmes St., Cincinnati, O.

USE REPLY CARD—CIRCLE No. 2

Variable Speed Drive

. . . cuts speed change downtime

Four-unit variable speed drive series is engineered to cut downtime on speed changes. Compon-



ents include a variable pitch motor sheave, a set of wide range belts, a companion sheave and a slide motor base. Taper-Lock bushing principle is employed for both sheaves, enhancing rapidity and ease of speed change.

Variable sheave assembly locks on the motor shaft as a unit with the turn of a screw. Pitch diameter is changed easily and positively by a one-point adjustment. Belts have deep sidewalls that should help insure longer life. Dodge Mfg. Corp., Dept. ST, Mishawaka, Ind.

USE REPLY CARD—CIRCLE No. 3

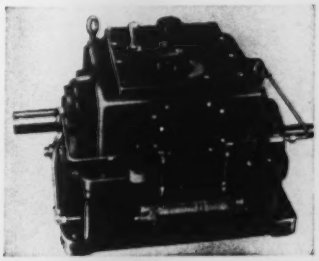
REPLY CARDS

on page 341 will bring you more information on any new products and equipment in this section.

Change Speed Units

. . . standardized to cut costs

Change speed units are introduced in a standardized line to cut costs and avoid delayed delivery of



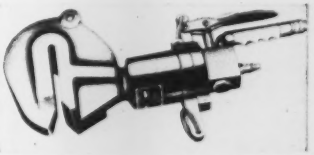
specially-built orders. The standardized units are positive geared drives, using herringbone gears throughout. No belts are employed, thus wear and resulting speed variation should be reduced. Units are available in 2, 3 and 4-speed combinations in a wide ratio and horsepower range for speed reducing, increasing or a combination. Philadelphia Gear Works Inc., Dept. ST, Venango & G Sts., Philadelphia 34, Pa.

USE REPLY CARD—CIRCLE No. 4

Hydraulic Guillotine Shear

. . . cuts 4 x 5/16-inch strip

Model S54-164E hydraulic guillotine shear is operated by a choice of hand or foot valve control. The



shear is powered by a 2-hp electric high-pressure pump equipped with a 3-phase, 220/440-v, 60-cycle motor. The unit's 25 feet of connecting hose assures ample mobil-

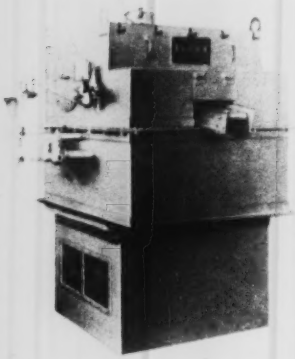
ity. Model cuts 4 x 5 16-inch strip steel. Manco Mfg. Co., Dept. ST, Bradley, Ill.

USE REPLY CARD—CIRCLE No. 5

Automatic Billet Descaler

. . . has removable scale basket

Billet descaling cabinet, with removable scale basket, is equipped with a gravity conveyor head and is fully automatic in operation. Descaler is available in both pit-mounted and floor-mounted types. Spray ring fitted with six spray



nozzles completely encircles the billet. Nozzles are directed at both ends of the billet to remove scale completely.

Roller conveyor arrangement withstands extreme temperatures. Spray nozzles are readily accessible for replacement when necessary. Unit is all-welded steel construction with rust-proof screening in the scale basket. Elmes Engineering Division, American Steel Foundries, Dept. ST, 1184 Tennessee Ave., Cincinnati 29, O.

USE REPLY CARD—CIRCLE No. 6

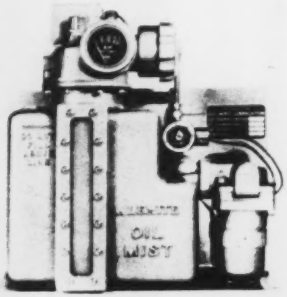
Oil-Mist Lubricators

. . . signal low oil level

One-gallon oil reservoirs and built-in automatic warning switches that signal the operator as oil level becomes too low are introduced to further reduce the human factor involved in automatic lubrication.

Gallon-size reservoir should cut frequence of filling and, more important, the signalling device makes it impossible for the unit to run dry accidentally.

Two models are available. Model 4953 is wired with a normally-open switch that makes contact when the level of the oil goes below 23 ounces. The switch sets off



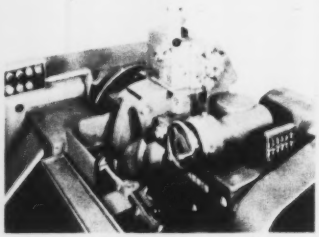
an immediate warning. Model 4859 has a closed switch that breaks contact when the oil level goes below 23 ounces, shutting off the machine. Both models have one-gallon reservoirs. Alemite Division, Stewart-Warner Corp., Dept. ST, 1826 Diversey Pkwy., Chicago 14, Ill.

USE REPLY CARD—CIRCLE No. 7

Semiautomatic Grinder

. . . grinds five surfaces at once

Grinder is designed for rapid precision grinding of all blades, buckets, vanes and nozzles used in current jet engine designs. It employs a 24-inch diameter wheel



to grind the leading and trailing edges in addition to external airfoil surface, platform and platform radius. To grind contour or airfoil shape that varies from root to tip, the grinder has a rocking cradle and master cam.

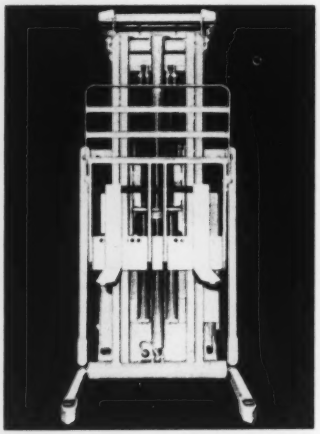
A variety of cycles is available, depending on the part to be ground and the method of handling desired. On a typical forged steel bucket, $\frac{1}{8}$ to 3/16-inch of metal can be removed from the forging in one pass. Landis Machine Co., Dept. ST, Waynesboro, Pa.

USE REPLY CARD—CIRCLE No. 8

Adjustable Base Forks

. . . handles 32-48-inch pallets

Adjustable base forks made for attachment to straddle-type electric tiering trucks handle pallets varying in widths from 32 to 48 inches. Made of welded steel sections, forks are hinged to the main



frame and adjusted manually by a screw arrangement. Forks can be used with 2000 or 3000-pound capacity trucks having standard load wheels. Raymond Corp., Dept. ST, 9199 Madison St., Greene, N. Y.

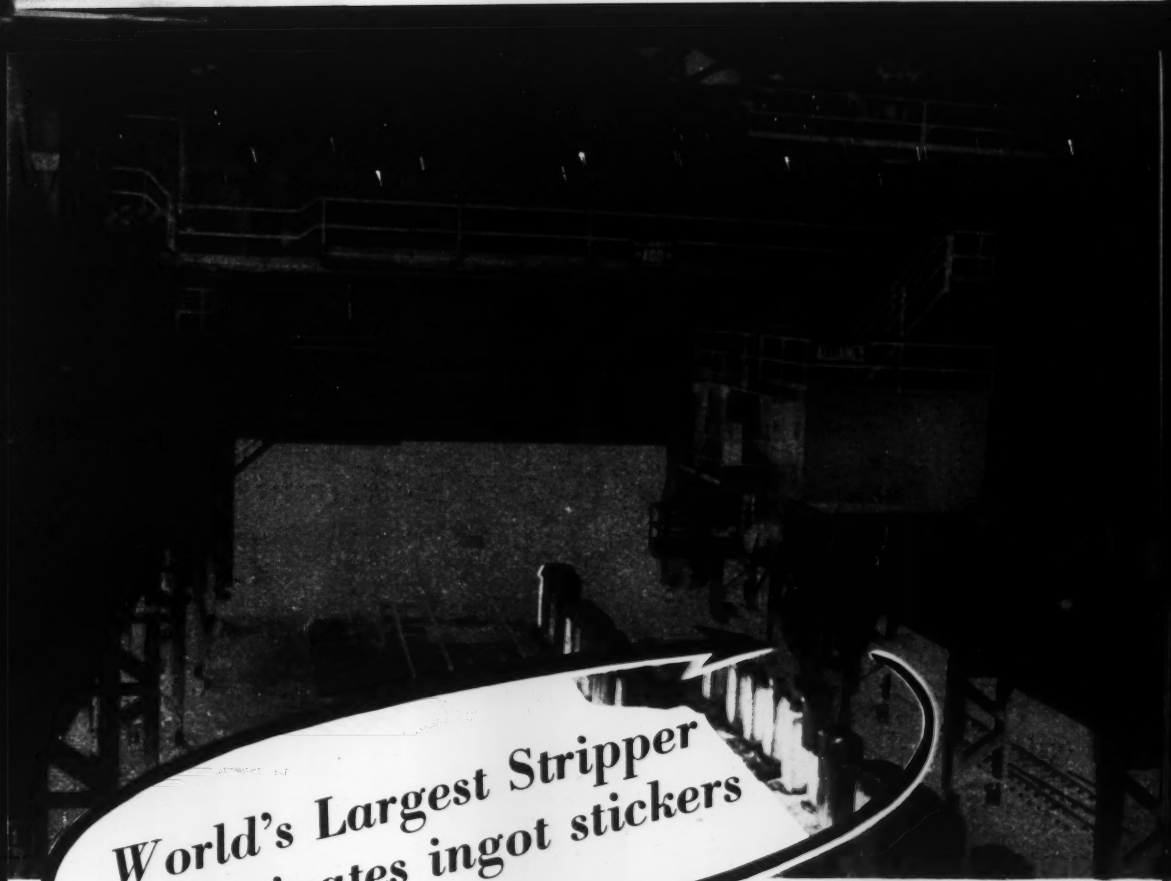
USE REPLY CARD—CIRCLE No. 9

Broken Tap and Drill Remover

. . . large plate simplifies setup

Ground work plate measuring $28\frac{1}{2}$ x $39\frac{1}{2}$ inches is included in a broken tap and drill remover to prevent large castings from hanging over the side or end of the machine and to keep liquid coolant from running onto the floor. The large cast iron T-slotted plate also simplifies setup, saving time and avoiding need for holding fixtures on job setups.

A screw-feed is used for working the radial arm up and down the column. The radial arm is ad-



World's Largest Stripper eliminates ingot stickers

The big 400-ton, push-pull, low head room, screw-type Alliance Stripper Crane is equipped with a stripping mechanism that exerts 2½ million pounds of pressure to smoothly strip moulds from ingots. What's more, a retractable bull nose and gripping tongs enable a single operator to make all necessary adjustments to strip either large end-up or small end-up ingots. These special Alliance-engineered features eliminate stickers, make possible tremendous savings in time, moulds and costly alloy ingots.

Alliance . . . world's largest builder of the world's largest cranes . . . makes a habit of offering industry greater strength and lifting versatility. Our big strippers, built with a name plate rating of 400 tons and overload rating of 1200 tons, embody many other exclusive features of design:

- ★ **Special electrical counterweight (counter torque device) developed by The Alliance Machine Company which prevents ingots from falling and inflicting damage to buggies.**
- ★ **No slack cable during stripping operation.**
- ★ **Eliminates the heavy and hazardous counterweights formerly used.**
- ★ **By means of a unique lubricating device, the ample size bronze nut gives many years of trouble-free service.**
- ★ **Special system of spiral bevel and single helical gears results in smoother operation.**
- ★ **All gears are enclosed and run in oil.**
- ★ **Cab that provides the operator with maximum visibility and safety.**

These and many more features are the reasons why it pays to consult Alliance if you're planning for more, newer and better lifting power for your plant. Write today for an analysis of your specific needs.

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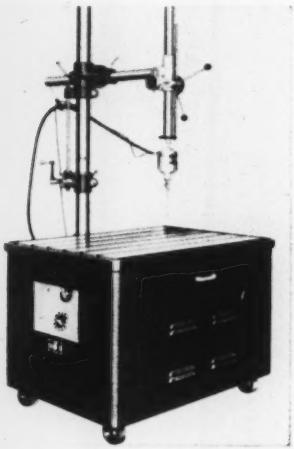
justable through 360 degrees in all planes to allow the disintegrating head to operate at any predetermined compound angle or position. This head is combined with the positive automatic 20-inch



travel gravity feed to eliminate lost cutting time due to interrupted disintegration. Electro Arc Mfg. Co., Dept. ST, Box 448, Ann Arbor, Mich.

USE REPLY CARD—CIRCLE No. 10

Center-Break Switches

PMK horizontal center-break switches incorporate a contact assembly featuring independently sprung pressure-applying springs, a bronze ball bearing swivel terminal and insulator bearings with nonrusting, double race, stainless steel bearings. They are available in all standard voltage ranges from 7.5 to 161 kv; ampere ratings of 400, 600 and 1200. Delta-Star Electric Co., division of H. K. Porter Co. Inc., Dept. ST, 2437 W. Fulton St., Chicago, Ill.

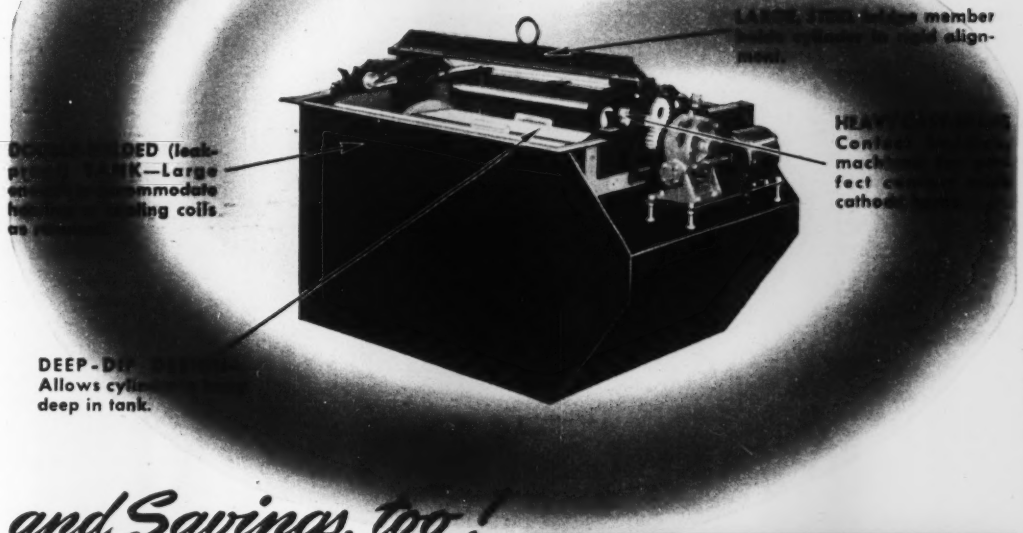
USE REPLY CARD—CIRCLE No. 11

Blowpipe Cutting Attachment

. . . cuts thicknesses to 8 inches

Cutting attachment that fits on either of two Prest-O-Weld blowpipes, cuts steel and other metals up to 8 inches thick. This is an increase of 2 to 4 times the thickness that previous models could cut. However, cutting range increase is achieved without corres-

ONLY Udylite PLATING BARRELS GIVE YOU ALL THIS . . .



and Savings, too!

No other plating barrel can match the Udylite Barrel in QUALITY, EFFICIENCY and DURABILITY. Udylite Barrels plate the work—not the cylinder. Electrical insulation is arranged so that ALL the current flows directly to the work pieces. Cathode leads are encased in unbroken insulation . . . panels cannot absorb solution . . . there is no possibility of any element of a Udylite Barrel diverting current from the work being processed.

This not only results in faster, more uniform plating but also gives a substantial savings in current consumption.

On the basis of actual service records, the Udylite Plating Barrel lasts longer and produces more work with lower operating and maintenance costs than any barrel built! Ask your Udylite Technical Man about it. Or write *The Udylite Corporation, Detroit 11, Michigan*, for full details. There's no obligation.

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NEW

NEW from SKF

the HESS-BRIGHT "SY" UNIT PILLOW BLOCK

A new Unit Pillow Block, designed by SKF to meet tomorrow's needs of modern industry.

Here are the design features

- SKF Red Seal, made of DuPont Fairprene, retains lubricant. Wiping action of the seal against the inner ring is practically frictionless.
- Rotating flingers exclude dirt.
- Set screws for ease of installation.
- Spherical outer ring compensates for initial misalignment.
- Alemite fitting for re-lubrication.
- Interchangeability with existing installations made possible by bolt hole spacing and center height features.
- Shaft diameters $1\frac{3}{16}$" to $2\frac{15}{16}$".

Detailed illustration of rotating flinger and RED SEAL—the extremely light tension contact seal.

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SKF INDUSTRIES, INC., Phila. 32, Pa.—*manufacturers of* **SKF** *and* HESS-BRIGHT *bearings.* 7322-A

ponding increase in operating pressures.

Design features include a large-diameter oxygen delivery tube and an improved mixer. About 55 pounds psi oxygen pressure is needed to cut 4 inches of steel; 100 pounds psi will cut 8 inches. The CW-122 attachment connects to the W-121 and W-122 blowpipes without a wrench. Linde Air Products Co., division of Union Carbide & Carbon Corp., Dept. ST, 30 E. 42 St., New York 17, N. Y.

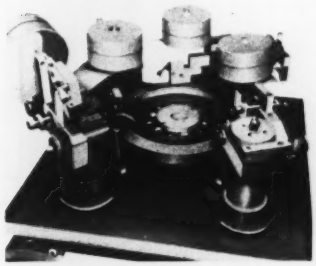
USE REPLY CARD—CIRCLE No. 12

Multiple Head Surface Grinder

. . . works solid carbide blanks

Multiple head tungsten carbide surface grinder is made for production grinding of solid carbide blanks to a finish of 1 to 2.5 rms. Gage block flatness is produced by employing a 150-grit diamond wheel.

Grinder holds dimensions to plus



or minus 0.0002-inch. Wheel can be dressed and trued to 0.0005-inch in a matter of minutes. Diamond salvage is less than 1 carat per pound of sludge. Spike Mfg. Co., Dept. ST, 24609 Middlebelt Rd., Farmington, Mich.

USE REPLY CARD—CIRCLE No. 13

Electronic Flow Meter

. . . holds 0.5 per cent accuracy

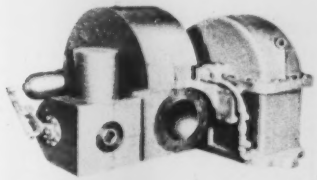
Fluid measurement over a wide temperature and pressure range with accuracy of 0.5 per cent is possible with an electronic flow meter made by Brown Instruments Division, Minneapolis-Honeywell Regulator Co., Wayne and Windrim Aves., Philadelphia 44, Pa. Application is recommended with chemical compounds, including strong caustics and nitric acid, for measuring, recording and controlling flow at one or more points.

USE REPLY CARD—CIRCLE No. 14

High Speed Reduction Gears

. . . for mechanical-drive turbines

A line of high-speed reduction gears for mechanical drive turbines is available in built-in or coupled designs. The former has turbine and gear case firmly secured together, with turbine wheels and pinion mounted on the same high-speed shaft. This eliminates exhaust-end bearing and coupling.



The coupled design is a self-contained gear unit that is flexibly

Cut master model costs 50%

REZOLIN TOOL-PLASTIK

the only ***non-shrink*** *casting resin*

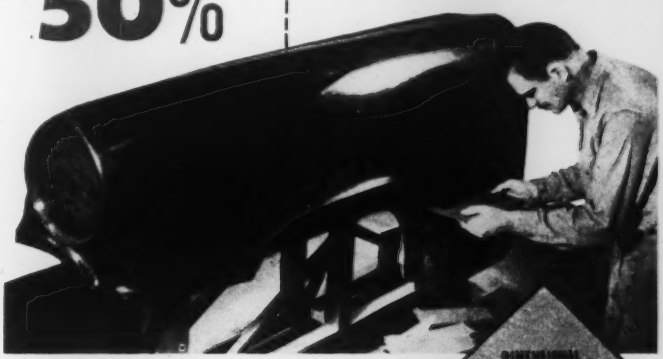


Photo courtesy Ford Motor Company.

DIMENSIONAL STABILITY and sharp definition are retained in Rezolin Tool-Plastik master model because it is not affected by humidity and temperature.

A thermosetting liquid phenolic plastic of exceptional dimensional stability and ease of handling, Rezolin Tool-Plastik is mixed cold and readily poured without pressure into simple molds. Rezolin Tool-Plastik models, masters and production duplicates are easily manufactured in your own plant without expensive shop equipment or highly skilled labor. *Non-Shrink* Rezolin Tool-Plastik eliminates the need for shrink patterns. It may be machined and polished by the use of conventional shop equipment.

Other Applications for Rezolin Tool-Plastik

Stretch dies . . . Acrylic form dies . . . Double-action draw dies . . . Foundry patterns . . . Check fixtures . . . Polyester laminating molds . . . Trim and routing fixtures . . . Master models . . . Jig bases . . . Hydropress dies . . . Spinning chucks.

STABILITY — The dimensional instability of hardwoods in master tooling is a recognized problem. Rezolin Tool-Plastik is not affected by variation in temperature and humidity.

SAVES TIME — Rezolin Tool-Plastik cuts tooling time 50%. Hand finishing is practically eliminated because Non-Shrink Rezolin is cast net from model or master.

DUPLICATING — Models of Rezolin Tool-Plastik are quicker and cheaper to construct. Duplication of models is accomplished with extreme accuracy in minimum time and cost. They are harder, more accurate and durable.

DURABILITY — Rezolin Tool-Plastik is impervious to weather and aging; needs no protective coatings.

Complete 6¼-lb. sample kit sent for $5.00. Freight postpaid. Write for Master Model Application Bulletin AI-10.

REZOLIN TOOL-PLASTIK

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Serving Industry Since 1938

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LAY YOUR HAND
On a
McDANEL
Combustion
Tube

It's very FEEL
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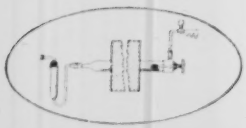

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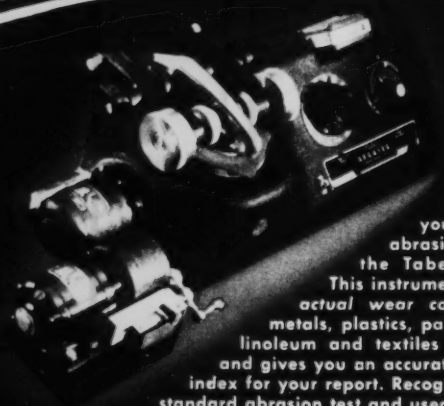

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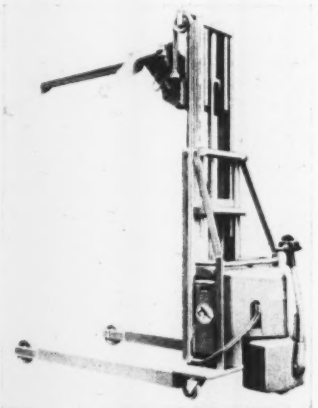
coupled to a separate turbine drive. Gears are offered in ratios up to 5:1 for built-in units; up to 8.5:1 for the coupled design. Elliott Co., Dept. ST, Jeannette, Pa.

USE REPLY CARD—CIRCLE No. 15

Side Discharge Truck

. . . lifts, stacks cored pieces

Designed for side discharge, electric JackStacker truck will lift and stack any cylindrical object having a core hole. Model's capacity is 1100 pounds. It operates in 38½-inch wide aisles and, with the adjustable carriage boom, can handle rolls 53 to 88 inches long. Lowered height to the lifting hooks is 8 inches; lifting height, 8 feet, 6 inches. Side motion of the lifting arms is 31 inches on either side of the center line and is controlled from the handle head. Lewis-Shepard Products Inc., Dept. ST, Watertown, Mass.



USE REPLY CARD—CIRCLE No. 16

Universal Testing Machine

. . . employs electric weighing

Universal testing machine incorporates an electric weighing system and electronically-controlled, motor-driven loading mechanism. The model FGT Baldwin-Emery SR-4 has capacity for a 50,000-pound load. Weighing and measuring tolerances are 0.2 per cent of reading. Indicator or recorder responds at high speed to dynamic as well as static loads. Standard

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For over three quarters of a century Brownhoist has engineered, designed and built boat unloaders, storage bridges, cranes and car dumpers for efficient handling of coal, ore and other bulk materials in practically every corner of the world.

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Brownhoist equipment includes unloaders, fast plants, traveling bridge cranes, Diesel and Diesel Electric locomotive cranes, clamshell buckets, car dumpers, car pushers, shipyard cranes, and related machinery.

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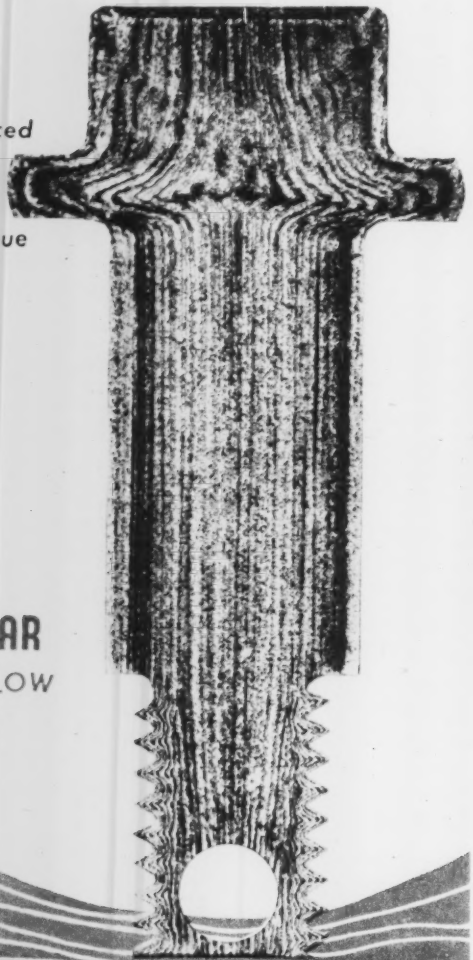

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Camcar's technical ability to control cold metal flow is your assurance of complete blueprint quality in all finished pieces. What's more, the cost savings in your assembly line supply are astonishing. Specify Camcar Cold-Flow for all your special metal parts requirements.

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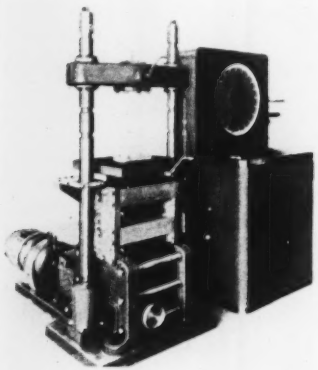
loading speed is 0.025 to 9.0 inches per minute.

Automatic load control maintains constant load, strain, rate of loading or strain rate to enable determination of creep, rupture and relaxation properties. Three load ranges are provided on a separate



indicator with 24-inch diameter dial that has 1000 graduations. Ranges are 0 to 50,000 pounds; 0 to 10,000 pounds; and 0 to 2000 pounds. Baldwin-Lima-Hamilton Corp., Dept. ST, Philadelphia 42, Pa.

USE REPLY CARD—CIRCLE No. 17

Synthetic Coating

Pozcote is a corrosion resistant synthetic coating for metal, wood and masonry surfaces. It contains inert synthetic resins and is impervious to water, acids, alkalis, alcohol, oils and grease. The coating is recommended for floors, walls, woodwork, machinery and equipment. Monroe Co. Inc., Dept. ST, 10703 Quebec Ave., Cleveland 6, O.

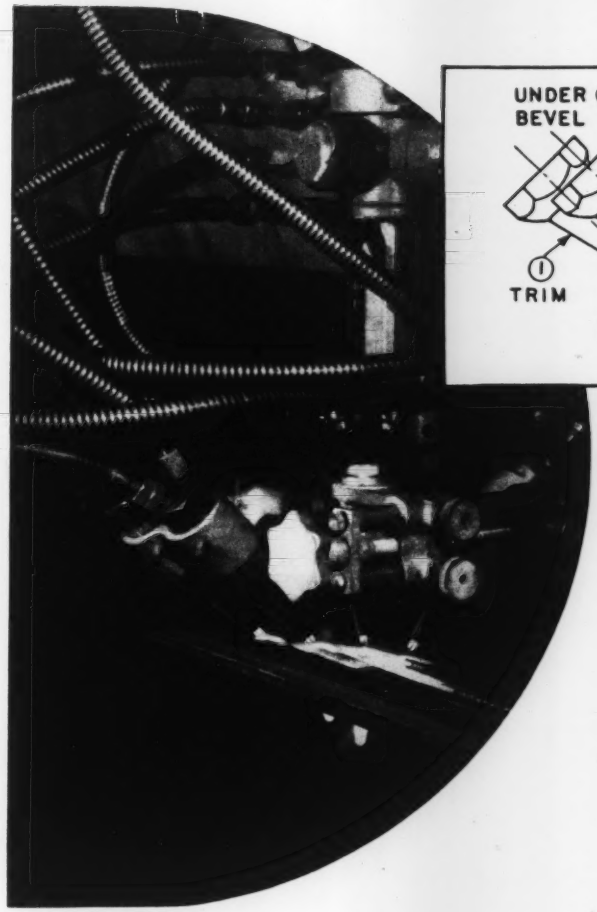
USE REPLY CARD—CIRCLE No. 18

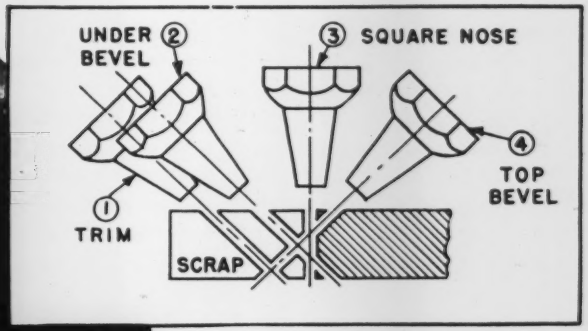
Adjustable Tool Holder

. . . avoids work with bushings

Tool holder with an adjustable v-jaw holds any diameter tool from 1/64 to 1/2-inch without use of bushings or other accessories. Precision grinding of all working surfaces makes the holder's shank and jaw section permanently parallel within 0.0005-inch in 6 inches. Run-out is less than 0.0001 per inch.

In use, tool is inserted in the





One pass gets armor plate or *any* plate ready for welding

Swift-moving oxy-acetylene flames prepare steel plate edges for welding in a fraction of the time required by mechanical methods. Multiple nozzles, cutting in different planes simultaneously, slash with ease through any commercial thickness. *Just one pass to "finish" dimensions* turns out a square edge, single bevel, single bevel and nose, double bevel, double bevel and nose, or J-groove and nose. Edge preparation costs tumble; production booms.

LINDE's oxygen-cutting methods are simple and flexible. They are economical and easy to use. They cut plates so smoothly and accurately that *no machining is necessary*—edges are ready to weld "as cut". Rigid fit-up and contour specifications are easily met. Yet, initial investment in OXWELD flame-cutting equipment is only a fraction of that for comparable machine tools. Upkeep over the years is extremely low.

On-the-job power needs are negligible. Reaction of cutting oxygen with hot steel does all the work. Only fractional horsepower is required to move the cutting nozzles along a straight line, radius, or any guided path over the line of cut.

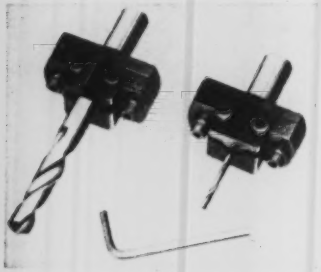
For further details, telephone or write today. LINDE AIR PRODUCTS COMPANY, a Division of Union Carbide and Carbon Corporation, 30 E. 42nd St., New York 17, N. Y. Offices in Other Principal Cities. In Canada: Dominion Oxygen Company, Limited, Toronto.

The terms "Linde" and "Oxweld" are registered trade-marks of Union Carbide and Carbon Corporation.

Linde Trade-Mark

Products and Processes for MAKING, CUTTING, JOINING, TREATING, AND FORMING METALS

axially-true jaw section and jaw screws tightened. Dead center adjustments can then be made by floating the tool into position in the normal way and tightening the



unit's locking screws. One wrench tightens both jaw and locking screws. Brookfield Inc., Dept. ST, 755 Boylston St., Boston 16, Mass.

USE REPLY CARD—CIRCLE No. 19

Portable Roller Conveyor

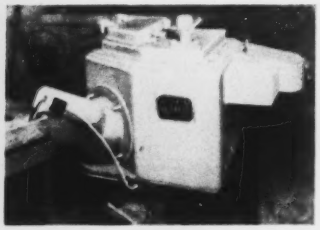
No. 2520 lightweight portable roller conveyors have a 2½-inch channel and 2-inch diameter rollers. They are made in 12, 16, 18, 20 and 28-inch widths with rollers on multiples of 3 or 4-inch centers. Mechanical Handling Systems Inc., Dept. ST, 4601 Nancy Ave., Detroit 12, Mich.

USE REPLY CARD—CIRCLE No. 20

Molten Metal Discharge Unit

. . . pours accurately into molds

Automatic unit that pours accurate amounts of molten metal, particularly aluminum, into molds



is designed to discharge directly into the cold chamber of die casting machines. Metal is taken from a point below the surface of the melt, eliminating danger of pouring surface oxides or scum into the casting. Called the Ajaxomatic, the unit acts as a combined holding furnace and automatic pouring unit. Temperature and alloy composition of the melt are maintained accurately.

Inert refractory materials and electric heating are used throughout. Casting weight is selected by electronic timer control and repeated automatically. Normal casting range reaches from ½-pound to 5 pounds. Castings up to 20 pounds can be produced with slight modification. Ajax Engineering Corp., Dept. ST, Hancock St., Trenton 7, N. J.

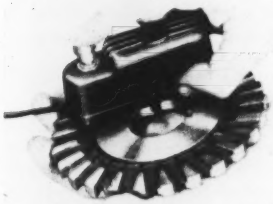
USE REPLY CARD—CIRCLE No. 21

Portable Demagnetizer

. . . neutralizes in one pass

Portable instrument thoroughly demagnetizes tools, dies, parts and pieces by the simple action of sliding over the item's surface. The demagnetizer is plugged into any 110-v ac outlet. On top of the base, in an offset, is a single-pole mo-

mentary-action switch that is normally open. In the bottom of the base are three poles of laminated silicon steel. By pressing the switch, current is closed, setting up a field of flux that neutralizes magnetism. Releasing the switch automatically shuts off the unit. Enco Mfg. Co., Dept. ST, 4520 W. Fullerton Ave., Chicago 39, Ill.



USE REPLY CARD—CIRCLE No. 22

Power Press Guard

Basket enclosure type guard is designed to meet exacting safety requirements of users of punch presses of all sizes, makes and types. It is made in several sizes, each custom built to your specifications. Slotted mounting brackets enable easy installation or removal of guard. Searjeant Metal Products Inc., Dept. ST, Mendon, N. Y.

USE REPLY CARD—CIRCLE No. 23

Centrifugal Fire Pump

A gasoline powered, self-priming, centrifugal fire pump has a capacity of 15,000 gallons per hour and delivers water at pressures up to 100 pounds. It is equally effective in delivering fog, spray, steam or foam. McCulloch Motors Corp., Dept. ST, Los Angeles, Calif.

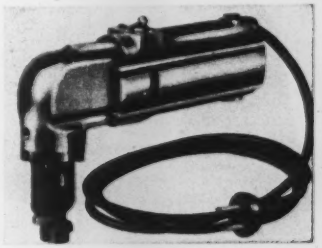
USE REPLY CARD—CIRCLE No. 24

Heavy-Duty Portable Nibbler

. . . cuts 14 gage stainless

Portable nibbler cuts 14-gage stainless steel, galvanized iron and softer materials without distortion. Other applications include cutting holes in tubes and ducts without damaging original contour. The nibbler can be used as a hand tool or mounted in a vise for bench operations. Minimum cutting radius is $\frac{7}{8}$-inch.

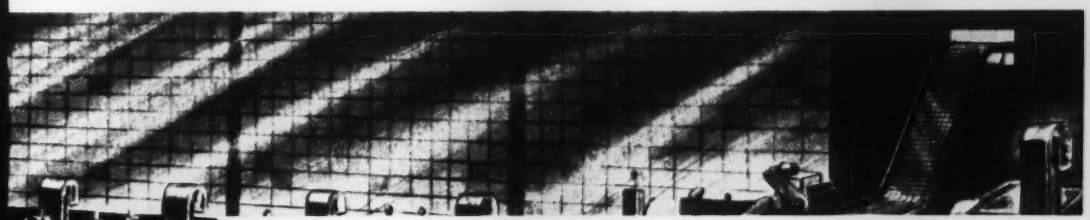
Housed in an aluminum casting, the unit weighs $7\frac{1}{2}$ pounds. Anti-friction bearings are employed on all rotating parts. Gears are precision hardened. Fenway Machine Sales Co. Inc., Dept. ST, 20 S. 15th St., Philadelphia 2, Pa.



USE REPLY CARD—CIRCLE No. 25

Magnetic Tagline

Magnetic tagline for use on clamshell or electromagnetic service consists of a drum, mounted on extension of hoisting drum shaft.



. . . speed-up production

For full utilization of vital machinery and skilled manpower, mechanize your scrap handling. MAY-FRAN automatic systems increase production by eliminating machine downtime for scrap removal and end manual lifting and hauling.

Whether your scrap volume is large or small, MAY-FRAN can design and install an automatic handling system to meet your needs. Hot, wet or highly abrasive chips, turnings and borings can be removed continuously from operating machine tools by CHIP-TOTE conveyors and transported to disposal point on MAY-FRAN hinged-steel belting.

Leader in automatic scrap handling systems, MAY-FRAN has the technical skill and experience to solve your scrap handling problems. Write today for illustrated catalog.

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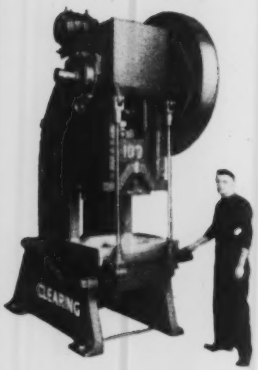
Jim Carns didn't learn it from his Dad

The Carns hardware store has been on the same corner for eighty years, and Jim is the third generation proprietor. His father died in 1927. Things have changed in the hardware business since then.

Jim's father avoided stamped articles because in his day they were often flimsy and inaccurate—"ten cent store stuff." Today, pressed metal parts can be made strong, rigid, and to close tolerances. They're smooth, light in weight, low in cost—no wonder the public prefers them.

Clearing presses have contributed greatly to this revolution in the manufacture of metal parts. If you are making metal objects by some slower, more costly process, it will pay you to investigate modern press methods. Ask a Clearing engineer to show you possible adaptations to manufacture your product at minimum cost—on a Clearing press.



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HAMILTON DIVISION, HAMILTON, OHIO

CLEARING PRESSES

THE WAY TO EFFICIENT MASS PRODUCTION

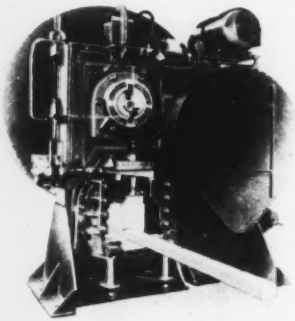
which is provided with a series of permanent magnets. By their magnetic attraction to the flange of the tagline drum, a constant pull is exerted on tagline rope. Osgood Co., Dept. ST, Marion, O.

USE REPLY CARD—CIRCLE No. 26

Combined Billet Breaker, Shear

. . . breaks or shears nicked billets

Combined billet-breaker and shear is capable of breaking nicked billets and shearing them, with regular shear knives either hot or cold. Machine is equipped with an automatic air-operated holddown that clamps billets while breaking



them into multiples. Other components include tool steel knife seats that can be added when the machine is to be used as a shear. Smallest machine is rated at 325 tons; the largest has a shearing tonnage pressure of 2200 tons. Buffalo Forge Co., Dept. ST, Box 985, Buffalo 5, N. Y.

USE REPLY CARD—CIRCLE No. 27

Variable Speed Motor

Lightweight Varidrive motor type 5 VA in fractional horsepower is equipped with mechanical remote control. This includes a control handwheel with indicator dial and a 5-foot flexible cable. Motor

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INFORMATION

AVAILABLE FOR THE ASKING

71. Gage Testing Instrument

Republic Flow Meters Co.—The low pressure calibrator for testing and calibration of instruments operating at pressures ranging from 0 to 20 in. water—vacuum, pressure or compound—is subject of 4-page descriptive folder No. 52-3. Features, engineering data and how-to-use instructions are given.

72. Combustion Safeguards

Selas Corp. of America—Two protective devices used in piping systems of gas-and-air combustion systems are featured in 12-page illustrated bulletin SC-1006. They are the automatic fire check uses to detect, localize and extinguish flashback in gas-air mixture lines close to gas burners, and the safety blowout used to prevent flashback damage to combustion control equipment.

73. O-Ring Characteristics

Parker Appliance Co. — Catalog 5160A1 offers complete data and dimensions for precison O-rings molded of Parkone compounds for resistance to temperatures in —100° to 500° F range. They also resist oxidation, solvent action of high aniline oils and fluids and rapid aging.

74. Gas-Driven Compressor

Clark Bros. Co.—Model HMA gas-engine driven compressors, made in models with two, four, six and eight cylinders, with brake horsepower of 80 to 330, are described and illustrated in 48-page catalog No. 124. Specifications, engineering data and other pertinent information are included.

75. Turbine Vane Pumps

Food Machinery & Chemical Corp., Peerless Pump Div.—Construction details and operating principles of close-coupled and flexible-coupled electric drive turbine vane pumps for hot and cold clear water or vaporous liquids are presented in 12-page bulletin B-2205. Head capacity selection charts as well as tabulated dimensional data are featured. Capacities range up to 58 gpm at 3500 rpm and 56 gpm at 1750 rpm.

76. Selecting a Crusher?

Pennsylvania Crusher Co. — "To The Man Who, Sometime, May Want To Select a Crusher" is the title and theme of 12-page illustrated brochure. It explains in nontechnical language the various crushing methods and where they apply in crushing procedure. This can help you!

77. Shop Equipment

Precision Equipment Co.—Looking for a source of clothing lockers, safety ladders, hand trucks, bins and drawers, tote pans, ovens, pumps, files, fire extinguishers, scales, rest chairs, electric tools, files and rotary bins? If so, send for this 24-page illustrated and descriptive catalog, with prices.

78. Straightening Machines

F. J. Littell Machine Co.—Equipment for straightening coil stock and feeding it to the press is found in bulletin 3H on the 308 series of variable speed straightening machines. Description of the function, operation and capacities in the ten machines available is included.

79. Melting Furnaces

Lindberg Engineering Co.—Operation of stationary and tilting type two-chamber induction melting furnaces is explained in 8-page illustrated bulletin No. 560. Lindberg-Fisher furnaces are described and a rating capacity-dimension table and listing of typical applications are included.

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80. Tiering Truck

Raymond Corp.—Description of a straddle type tiering truck for double-face pallets is included in 2-page illustrated data sheet 730. The 2000-lb capacity truck eliminates counterweights, tiers from 6-ft aisles and maneuvers easily on 200-degree turning arc. Specifications are here, too.

81. Cut Thread Taps

Niles-Bement-Pond Co., Pratt & Whitney Div.—Standard hand, three-fluted hand, spiral-pointed hand, spiral-pointed machine screw and standard machine screw taps are covered by descriptive and dimensional data presented in 12-page circular No. 541.

82. Weldments & Castings

Acme Tank & Welding Div., United Tool & Die Co.—Basic facts about steel plate fabrication as compared with castings are presented in 24-page illustrated booklet "The Facts About Weldments and Castings". Much data are in tabular form. If you specify castings, this booklet is a "must."

83. Tank Lining

Metalweld Inc.—Data and illustrations on the application of flexible Koroseal to plating tanks, racks, vats, etc., are contained in 4-page bulletin K. Typical materials handled include nitric, sulphuric and chromic acids, bleaches, and many organics. Advantages and limitations are presented.

84. Recording Instruments

Leeds & Northrup Co.—48-page illustrated catalog ND46 (1) describes how Speedomax recorders and controllers are applied to various uses in production and research. Installation pictures are in the catalog, along with detailed specifications for each of the many types.

85. Forging Facilities

Pittsburgh Forgings Company's facilities for drop and upset forging, punching, welding, riveting, assembly and painting on agricultural, automotive, transportation and industrial equipment are illustrated and described in 8-page bulletin 5201. It reviews company's skills and tools for engineering, planning, production, heat treating and machining of forgings.

86. Cylindrical Grinders

Landis Tool Co.—34 illustrations, complete specifications and photos of typical grinding setups possible with 14 and 18-in. type C universal precision grinders are found in 16-page catalog J-52.

87. Braided Rod Packings

Garlock Packing Co.—Outlining advantages of Lattice-Braid rod packing, 8-page bulletin AD-131 contains sectional drawings showing structure, illustrations of different types, tables of service recommendations and specs and reports from users.

EDITORIAL REPRINTS:

88. Flame Plating Wear Parts

A new method which applies undiluted deposit of tungsten carbide on almost any metal is subject of STEEL reprint entitled "Flame Plating: Wearing Parts Get Longer Lease on Life." Process used by Linde Air Products Co. widens horizon for designers, and makes down-time due to severe abrasion a rarity. Coating thicknesses range from 0.0005 to 0.020-in.

89. Industrial Artillery

"Explosive Pressing Forms New Materials" is title of STEEL reprint by Associate Editor Ed Karpick which describes the explosive pressing method Kennametal Inc. uses to impart uniform pressed density into its new wear and high heat resistant material, Kentanium, or cemented titanium carbide. This bang-up process uses the breech block and chamber of an old Army 14-in. gun and compresses material enclosed in rubber pouches under liquid.

90. Forging Crankshafts

In STEEL reprint entitled "Crankshaft Output Tripled," H. C. Tuttle, Detroit Editor, describes the completely mechanized installation at Dodge Div.'s forge plant for continuous press forging of automotive crankshafts. V8 crankshafts are forged flat and then twisted on machine to place crankpin bearing in proper alignment. Production jumped from 50 to 150 cranks an hour.

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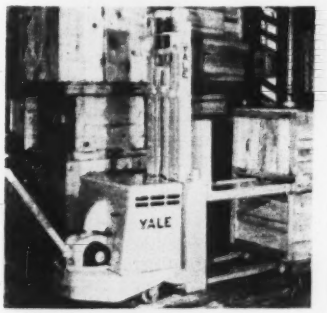
is available in $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$ and $\frac{3}{4}$-hp. U. S. Electrical Motors Inc., Dept ST, Box 2058, Los Angeles 54, Calif.

USE REPLY CARD—CIRCLE No. 28

High-Lift Pallet Truck

. . . stacks bins 120 inches high

High-lift 4000-pound capacity pallet truck is designed to transport and stack skid bins or single-face pallets. An addition to the Worksaver line of motorized hand trucks, the unit stacks at heights up to 120 inches. It has side caster



wheels for stability, providing constant floor contact under all operating conditions. Pallet forks are used instead of conventional forks for minimum overall truck length. Yale & Towne Mfg. Co., Dept. ST, Philadelphia 15, Pa.

USE REPLY CARD—CIRCLE No. 29

X-Ray Film Cassettes

Use of air bags and other methods of insuring permanent contact between screen and film are unnecessary when using the Permacon magnesium front cassette. Radiographic results are improved by uniformity and dependability of contact. General Electric Co., Dept. ST, 4855 Electric Ave., Milwaukee 14, Wis.

USE REPLY CARD—CIRCLE No. 30

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Sub-surface defects are quickly discovered with the Sperry Reflectoscope in the Grumman Aircraft Engineering Corp. plant.

SPERRY ULTRASONICS

INSURE QUALITY AND SAFETY

Large aluminum alloy forgings being tested after partial machining.

Critical areas of stress fittings being sonic tested.

Without quality there is no safety wherever metal parts are under stress. To insure the high quality of all components Grumman Aircraft Engineering Corporation uses Sperry Reflectoscopes to test raw materials and manufactured parts used in their famous planes.

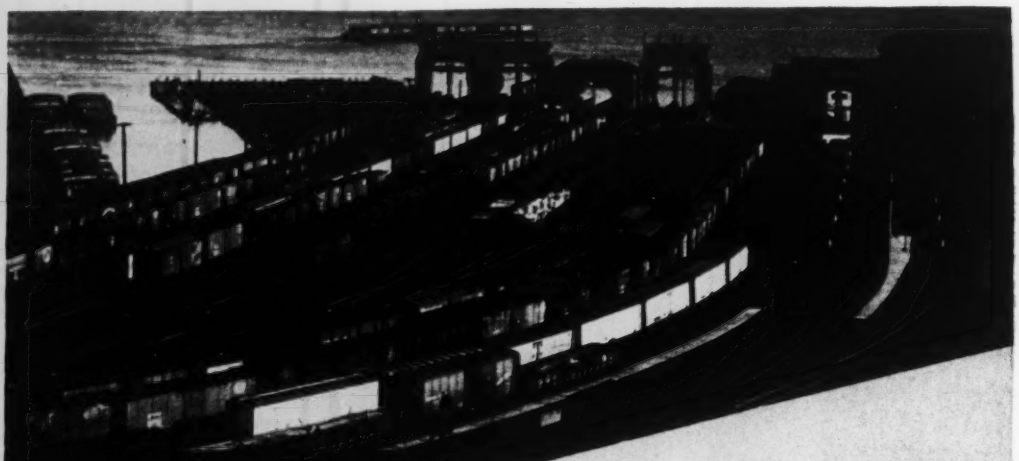
The Sperry Ultrasonic Reflectoscope is the most modern non-destructive instrument for on-the-spot testing of metals for the detection of defects. Not only are many hours of machining saved but manufacturers are assured that no hidden flaws exist to cause later failure.

Practically every type of metal can be quickly and accurately inspected with the Sperry Reflectoscope. Parts may be checked without dismantling at great time saving to industry.

Write for complete descriptive information on the Sperry Day-to-Day Inspection Service or ask for particulars covering the lease or sale of the Sperry Ultrasonic Reflectoscope.

Sperry

SPERRY PRODUCTS, INC.
610 SHELTER ROCK ROAD
Danbury, Connecticut
REPRESENTATIVES IN PRINCIPAL CITIES



THE STEEL YOU BUY DEMANDS *Complete Integration* TOO!

For only *complete integration* of every process can assure you quality-as-specified. Here is the big reason for Alan Wood Steel Company's *single control* of each production step—from ore mine to finished product.

Alan Wood steel making takes nothing for granted—involves no outside factors. We mine our own ore, test it in our own laboratories, smelt it in our own furnaces, roll it in our own rolling mills. And rigid Alan Wood quality control checks on every process—every step of the way.

Here is your warranty of *quality steel as specified!*

SPECIALTY PRODUCTS

STAINLESS CLAD STEEL
PERMACLAD Stainless Clad Steel combines the surface characteristics of solid stainless with the easy forming qualities of mild carbon steel—provides corrosion resistance at lower cost.

ABRASIVE ROLLED STEEL FLOOR PLATE

A.W. ALGRIP Abrasive Rolled Steel Floor Plate is made by rolling tough abrasive grain as an integral part of the upper portion of steel plate. Result: Positive protection against slipping, even on steep inclines.

ROLLED STEEL FLOOR PLATE
A W SUPER-DIAMOND
Rolled Steel Floor Plate, made with an alloyer, engineered pattern of raised, skid-resistant diamonds, is easy to clean, easy to match, and grips without a slip.

Over 125 Years of Iron and Steel Making Experience

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"Swede" Pig Iron
Foundry, Malleable, Bessemer and Basic

STEEL PRODUCTS
Plates (Sheared)
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(High Strength Plates)

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Special qualities in carbon, copper, or alloy analyses
A. W. Dynalloy
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Coiled and cut lengths
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A. W. ROLLED STEEL FLOOR PLATES
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PERMACLAD Sheets and Plates
Standard and special qualities available in desired finishes

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COKE
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COAL CHEMICALS
Coke Oven Gas • Crude Coal Tar Ammonium Sulphate • Industrial Benzol, Toluol, Xylol • Motor Benzol • Crude Solvent Naphtha Crude Naphthalene • Crude Tar Bases • Sodium Phenolate • Crude Light Oil Still Residue

ONE CONTROL FROM MINE TO USER

ALAN WOOD STEEL COMPANY

CONSHOHOCKEN, PA.

IVY ROCK, PA. • SWEDELAND, PA. • DOVER, N.J. • OXFORD, N.J.

The Market Outlook

THAT EXTRA GLOW over steel producing towns at night now is not all from the harvest moon. It's the reflection from a brilliant performance that's reaping a new crop of steel production records.

The records are coming so fast that some of them stand only one week. That's the case with the week ended Oct. 11. It eclipsed the record of the preceding week by yielding 2,170,000 net tons of steel for ingots and castings. That was a 20,000-ton gain, and the industry accomplished it by operating at 104.5 per cent of capacity, compared with 103.5 per cent in the preceding week.

HOW IT'S DONE—The new records are made possible by the additional new capacity coming into operation in the steel industry. Still higher production levels can be expected over the next few weeks as further new facilities come into use.

CALMER—Rapid recovery from the steelworkers' strike and the expansion in the steel capacity are tending to make some consumers less interested in forward buying than they were a few months ago. Pressure for narrow cold-rolled strip for delivery in the first quarter of 1953 is light. In fact there are fourth-quarter openings for this product. Wire mills are close to normal delivery schedules on more carbon products, both low and high carbon. Where books are open for first quarter there is no rush to cover. Some consumers lack government authorization to make purchases, but consumers with authorizations are slow to make forward commitments for wire.

On the other hand you can still find consumers scrambling for steel. Much of this scurrying is to fill the supply gap caused by the steel strike.

BUSY—As a result, Inland Steel Co., Chicago, which has been a big figure in rolling conversion steel for consumers trying to make ends meet in their steel supply, is booked full on its conversion capacity for the first quarter, and is turning down business. The automobile and farm equiomemt makers, big users of conversion steel, show little loss of interest yet in arranging for conversion tonnage.

Bars continue to be the No. 1 tight item in supply. This is particularly true of larger diameters. Estimates of 1953 output of farm equipment, a big outlet for bars, indicate volume may be off from 20 to 40 per cent but this isn't reflected in current demand for bars. Manufacturers in this field are pressing for a lot of steel now to balance inventories. Prospect is that the military shell program will expand, intensifying demand for large diameter quality bars. Forging shops are not only taking all the bars they can get but they are pressing for more. Railroad shops stepped up their demand for bars for maintenance.

TIGHT SPOT—Demand for plates remains overwhelming. It appears that the cartridge case program which makes quite a dent in plate consumption will be held at present levels. Thus the strain on supply won't be increased from this direction at least. Shortage of plates is restricting metalworking operations in some instances.

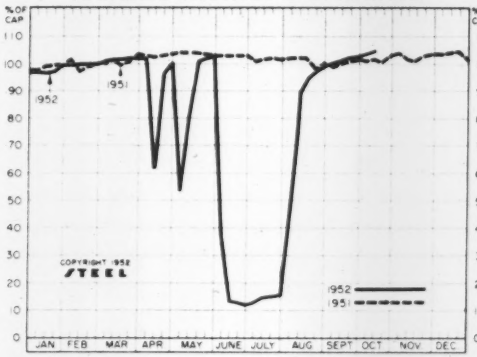
The supply of steel sheets is making headway in catching up with demand, although the requirements of the appliance and automotive industries are heavy.

DOUBLE TROUBLE—Some fabricators of structural steel have two worries. One is over lack of steel for now. The other concerns the lack of business for the future. In some areas, inquiry for fabricated structural steel is the slowest in at least three years. Contributing to the dullness are governmental restrictions on commercial construction and increasing costs.

Canada is following the United States and is raising steel prices. Canadian steel prices moved up $2.50 to $4.50 a ton, depending on the product. Bars, plates and cold-rolled sheets rose $3.50 a ton, while hot-rolled sheets climbed $2.50. On some products, prices are unchanged.

Canadian steel interests expect a general improvement in steel supplies by end of the first quarter.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Oct. 11	Change	Same Week 1951	Same Week 1950
Pittsburgh	105	+ 1*	100	103
Chicago	106.5	1*	96	103
Mid-Atlantic	98	0	99	99
Youngstown	106	0	94	108
Wheeling	99.5	+ 2	101	98
Cleveland	107	+ 1.5*	99.5	96
Buffalo	106.5	+ 0.5	104	104
Birmingham	102	+ 1	104	100
New England	95	+ 8	95	82
Cincinnati	90	0	101	103
St. Louis	108	0	95	94
Detroit	109	+ 1	101.5	104
Western	100	2.5	103	103
Estimated national rate	104.5	+ 1	101.5	101.5

Based on weekly steelmaking capacity of 2,027,040 tons in 1952; 1,999,034 tons for 1951; 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950.

* Change from revised rate for preceding week.

The Metalworking Outlook—p. 111 Production-Engineering News—p. 147

Composite Market Averages

FINISHED STEEL PRICE INDEX Bureau of Labor Statistics (1947-1949 = 100)	Oct. 7, 1952	Sept. 30, 1952	Month Ago	September Average
	130.7	130.7	130.8	130.8

AVERAGE PRICES (BUREAU OF LABOR STATISTICS)
Week Ended Oct. 7, 1952

Units are lbs unless otherwise noted below in parentheses. For complete description of products see insert following p. 28, STEEL, Sept. 8, 1952

Rails	$5.775	Sheets, C.R. carbon	$5.275
Track spikes	6.650	Sheets, galv.	6.995
Track bolts	9.958	Strip, C.R. carbon	5.100
Tie plates	4.775	Strip, C.R. stainless (10)	0.325
Joint bars	6.925	Pipe, black, buttweld (100 ft)	7.090
Plates, carbon	4.150	Pipe, galv., buttweld (100 ft)	9.196
Structural shapes	4.200	Conduit, tubes (100 ft)	11.355
Bars, tool steel, cb.	1.575	Tin plate (100 lb base box)	8.950
Bars, 312n alloy	9.575	Terne plate (100 lb base box)	7.750
Bars, stainless (18-8)	0.140	Wire, carbon, merchant	6.075
Bars, carbon	4.100	Wire, fence, galv.	6.488
Bars, reinforcing	4.050	Nails (100 lb keg)	7.350
Bars, C.F. carbon	5.925	Wire, barbed (80 rod spool)	5.940
Sheets, H.R. carbon	4.125	Woven wire fence (20 rod roll)	13.650

FINISHED PRICE INDEX, Weighted Calculated by STEEL*

	Oct. 7, 1952	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av. = 100)	181.40	181.40	181.40	171.92	128.96
Index in cents per lb	4.914	4.914	4.914	4.657	3.494

ARITHMETICAL PRICE COMPOSITES Calculated by STEEL*

Finished Steel, NT	$111.66	$111.66	$111.66	$100.32	$75.41
No. 2 Fdry. Pig Iron, GT	55.04	55.04	55.04	52.24	36.56
Basic Pig Iron, GT	54.66	54.66	54.66	52.16	36.13
Malleable Pig Iron, GT	56.77	56.77	56.77	53.27	37.13
Steelmaking Scrap, GT	$43.00	$43.00	$43.00	$44.00	$28.25

* For explanation of weighted index see STEEL, Sept. 16, 1946, p.94 of arithmetical price composites, STEEL, Sept. 1, 1952, p. 130

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS	Oct. 7, 1952	Week Ago	Month Ago	Year Ago	5 Yrs Ago
Bars, H.R., Pittsburgh	3.95	3.95	3.95	3.70	2.90
Bars, H.R., Chicago	3.95	3.95	3.95	3.70	2.90
Bars, H.R., del. Philadelphia	4.502	4.502	4.502	4.223	3.28
Bars, C.F., Pittsburgh	4.925	4.925	4.925	4.55	3.55
Shapes, Std., Pittsburgh	3.85	3.85	3.85	3.65	2.80
Shapes, Std., Chicago	3.85	3.85	3.85	3.65	2.80
Shapes, del. Philadelphia	4.13	4.13	4.13	3.918	2.94
Plates, Pittsburgh	3.90	3.90	3.90	3.70	2.95
Plates, Chicago	3.90	3.90	3.90	3.70	2.95
Plates, Coatesville, Pa.	4.15	4.15	4.15	3.95	3.15
Plates, Sparrows Point, Md.	3.90	3.90	3.90	3.70	2.95
Plates, Claymont, Del.	4.35	4.35	4.35	4.15	3.15
Sheets, H.R., Pittsburgh	3.775	3.775	3.775	3.60-75	2.80
Sheets, H.R., Chicago	3.775	3.775	3.775	3.60	2.80
Sheets, C.R., Pittsburgh	4.475	4.475	4.475	4.35	3.50
Sheets, C.R., Chicago	4.575	4.575	4.575	4.35	3.55
Sheets, C.R., Detroit	4.775	4.775	4.775	4.55	3.70
Sheets, Galv., Pittsburgh	4.075	4.075	4.075	3.80	3.00
Strip, H.R., Pittsburgh	3.75-4.225	3.75-4.225	3.75-4.225	3.75-4.00	2.80
Strip, H.R., Chicago	3.725	3.725	3.725	3.50	2.80
Strip, C.R., Pittsburgh	5.10-5.80	5.10-5.80	5.10-5.80	4.65-5.35	3.55
Strip, C.R., Chicago	5.35	5.35	5.35	4.90	3.65
Strip, C.R., Detroit	5.30-6.05	5.30-6.05	5.30-6.05	4.85-5.60	3.70
Wire, Basic, Pittsburgh	5.10-5.225	5.10-5.225	5.10-5.225	4.85-5.10	3.65-3.80
Nails, Wire, Pittsburgh	6.20-6.35	6.20-6.35	6.20-6.35	5.90-6.20	4.25
Tin plate box, Pittsburgh	$8.95	$8.95	$8.95	$8.75	$6.75

SEMIFINISHED					
Billets, forging, Pitts. (NT)	$70.50	$70.50	$70.50	$66.00	$56.50
Wire rods, ⅜-⅝", Pitts.	4.325	4.325	4.325	4.10-50	2.925

PIG IRON, Gross Ton					
Bessemer, Pitts.	$55.50	$55.50	$55.50	$53.00	$37.00
Basic, Valley	54.50	54.50	54.50	52.00	36.00
Basic, del. Phila.	59.25	59.25	58.27	56.61	38.72
No. 2 Fdry., Pitts.	55.00	55.00	55.00	52.50	36.50
No. 2 Fdry., Chicago	55.00	55.00	55.00	52.50	36.00
No. 2 Fdry., Valley	55.00	55.00	55.00	52.50	36.50
No. 2 Fdry. del. Phila.	59.75	59.75	59.75	57.11	39.22
No. 2 Fdry., Birm.	51.38	51.38	51.38	48.88	34.88
No. 2 Fdry. (Birm.) del. Chi.	58.93	58.93	58.93	56.43	38.25
Malleable, Valley	55.00	55.00	55.00	52.50	36.50
Malleable, Chicago	55.00	55.00	55.00	52.50	36.50
Charcoal, Lyles, Tenn.	68.50	68.50	68.50	66.00	44.00
Ferromanganese, Etna, Pa.	228.00	228.00	228.00	188.00	141.00*

* F.o.b. cars, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)					
No. 1 Heavy Melt., Pitts.	$44.00	$44.00	$44.00	$45.00	$28.00
No. 1 Heavy Melt., E. Pa.	43.50	43.50	43.50	43.50	29.50
No. 1 Heavy Melt., Chicago	42.50	42.50	42.50	44.50	28.25
No. 1 Heavy Melt., Valley	44.00	44.00	44.00	45.00	29.50
No. 1 Heavy Melt., Cleve.	43.00	43.00	43.00	44.00	28.25
No. 1 Heavy Melt., Buffalo	43.00	43.00	43.00	44.00	29.50
Rails, Rerolling, Chicago	52.50	52.50	52.50	52.50	46.25
No. 1 Cast, Chicago	50.00	50.00	50.00	49.00	43.50

* Nominal. † F.o.b. shipping point.

COKE, Net Ton					
Beehive, Furn., Connlsv.	$14.75	$14.75	$14.75	$14.75	$11.50-12.50
Beehive, Fdry., Connlsv.	17.00	17.00	17.00	17.50	14.00-15.00
Oven, Fdry., Chicago	23.00	23.00	23.00	23.00	17.50

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$56.50	$57.00	$57.50	$58.00
New York, del.		60.78	61.28	
Newark, del.	59.32	60.02	60.52	61.02
Philadelphia, del.	59.25	59.75	60.25	60.75
Birmingham District				
Alabama City, Ala. R2	50.88	51.38		
Birmingham, R2	50.88	51.38		
Birmingham, S6		51.38		
Woodward, Ala. W15	50.88	51.38		
Cincinnati, del.		58.93		
Buffalo District				
Buffalo, R2	54.50	55.00	55.50	
Buffalo, H1	54.50	55.00	55.50	
Tonawanda, N.Y., W12	54.50	55.00	55.50	
No. Tonawanda, N.Y., T5		55.00	55.50	
Boston, del.	63.15	65.65	66.15	
Rochester, N.Y., del.	57.52	58.02	58.52	
Syracuse, N.Y., del.	58.62	59.12	59.62	
Chicago District				
Chicago, I-3	54.50	55.00	55.00	55.50
Gary, Ind., U5	54.50		55.00	
Indiana Harbor, Ind., I-2	54.50		55.00	
So. Chicago, Ill., W14	54.50	55.00	55.00	
So. Chicago, Ill., Y1	54.50	55.00	55.00	
So. Chicago, Ill., U5	54.50		55.00	55.50
Milwaukee, del.	56.67	57.17	57.17	57.67
Muskegon, Mich., del.		61.30	61.30	
Cleveland District				
Chicago, I-3	54.50	55.00	55.00	55.50
Cleveland, A7	54.50	55.00	55.00	
Akron, O., del. from Cleve.	57.11	57.61	57.61	58.11
Lorain, O., N3	54.50			55.50
Duluth, I-3			55.00	
Erie, Pa., I-3	54.50	55.00	55.00	55.50
Everett, Mass., E1		59.25	59.75	
Fontana, Calif., K1	60.50	61.00		
Granite City, Ill., G4	56.40	56.90	57.40	
St. Louis, del. (inc. tax)	57.15	57.65	58.15	
Ironton, Utah, C11	54.50	55.00		
Geneva, Utah, C11	54.50	55.00		
LoneStar, Tex., L6	50.50	*51.00	51.00	
Minnequa, Colo., C10	56.50	57.50	57.50	
Rockwood, Tenn., T3			58.50	
Pittsburgh District				
Neville Island, Pa., P6		55.00	55.00	55.50
Pitts., N&S. sides, Ambridge				
Aliquippa, del.		56.37	56.37	56.87
McKees Rocks, del.		56.04	56.04	56.54
Lawrenceville, Homestead				
Wilmerding, Monaca, del.		56.66	56.66	57.16
Verona, Trafford, del.		57.19	57.19	57.69
Brackenridge, del.		57.45	57.45	57.95
Bessemer, Pa., U5	54.50		55.00	55.50
Clairton, Rankin, So. Duquesne, Pa., U5	54.50			
McKeesport, Pa., N3	54.50			55.50
Monessen, Pa., P7	56.50			
Shatpsville, Pa., S6			55.00	55.50
Steelton, Pa., B2	56.50	57.00	57.50	58.00
Swedeland, Pa., A3	58.50	59.00†	59.50	60.00
Toledo, O., I-3	54.50	55.00	55.00	55.50
Cincinnati, del.	59.97	60.47		
Troy, N.Y., R2	56.50	57.00	57.50	58.00
Youngstown District				
Hubbard, O., Y1	54.50	55.00	55.00	
Youngstown, Y1	54.50	55.00	55.00	
Youngstown, N5	54.50			55.50
Mansfield, O., del.	59.15	59.65	59.65	60.15

* Low phos. southern grade.

PIG IRON DIFFERENTIAL

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50%, no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton	
(Base 6.01-6.50% silicon; add $1.50 for each 0.5% Si)	
Jackson, O., G2, J1	$63.50
Buffalo, H1	66.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton	
(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)	
Niagara Falls, N.Y., P15	$91.00
Keokuk, Iowa, Openhearth & Fdry., frt. allowed, K2	92.50
Keokuk, OH & Fdry., 12½ lb piglets, 16% Si, frt. allowed, K2	95.50
Wenatchee, Wash., OH & Fdry., frt. allowed, K2	92.50

CHARCOAL PIG IRON, Gross Ton	
(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)	
Lyles, Tenn., T3	$68.50

LOW PHOSPHORUS PIG IRON, Gross Ton	
Cleveland, intermediate, A7	$59.50
Steelton, Pa., B2	62.50
Philadelphia, delivered	66.05
Troy, N.Y., R2	62.50

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Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, Oct. 9, 1952, cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company. Key on next two pages.

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 $81.00
Munhall,Pa. U5 74.00
Seattle S24 75.00

INGOTS, Alloy (NT)
Detroit R7 $97.00
Fontana,Calif. K1 83.00
Houston S5 65.00
Midland,Pa. C18 74.00
Munhall,Pa. U5 87.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 $59.00
Clairton,Pa. U5 59.00
Ensley,Ala. T2 59.00
Fairfield,Ala. T2 59.00
Fontana,Calif. K1 78.00
Gary,Ind. U5 59.00
Johnstown,Pa. B2 59.00
Lackawanna,N.Y. B2 59.00
Munhall,Pa. U5 59.00
So.Chicago,Ill. U5 59.00
So.Duquesne,Pa. U5 59.00

Carbon, Forging (NT)
Bessemer,Pa. U5 $70.50
Buffalo R2 70.50
Canton,O. R2 70.50
Clairton,Pa. U5 70.50
Cleveland R2 70.50
Conshohocken,Pa. A3 77.50
Detroit R7 73.50
Ensley,Ala. T2 70.50
Fairfield,Ala. T2 70.50
Fontana,Calif. K1 89.50
Gary,Ind. U5 70.50
Geneva,Utah C11 70.50
Houston S5 78.50
Johnstown,Pa. B2 70.50
Lackawanna,N.Y. B2 70.50
LosAngeles B3 89.50
Munhall,Pa. U5 70.50
Seattle B3 89.50
So.Chicago R2,U5,W14 70.50
So.Duquesne,Pa. U5 70.50
So.SanFrancisco B3 89.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 $76.00
Buffalo R2 76.00
Canton,O. R2 76.00
Canton,O. T7 78.00
Conshohocken,Pa. A3 83.00
Detroit R7 79.00
Fontana,Calif. K1 95.00
Gary,Ind. U5 76.00
Houston S5 81.00
Ind.Harbor,Ind. Y1 76.00
Johnstown,Pa. B2 76.00
Lackawanna,N.Y. B2 76.00
LosAngeles B3 96.00
Massillon,O. R2 76.00
Midland,Pa. C18 76.00
Munhall,Pa. U5 76.00
So.Chicago R2,U5,W14 76.00
So.Duquesne,Pa. U5 76.00
Struthers,O. Y1 76.00
Warren,O. C17 76.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 $87.50
Canton,O. R2 87.50
Cleveland R2 87.50
Fontana,Calif. K1 105.50
Gary,Ind. U5 87.50
Massillon,O. R2 87.50
So.Chicago,Ill. R2 87.50
So.Duquesne,Pa. U5 87.50

SHEET BARS (NT)
Fontana,Calif. K1(43) $76.00

SKELP
Aliquippa,Pa. J5 $3.65
Munhall,Pa. U5 3.55
Warren,O. R2 3.55
Youngstown R2, U5 3.55

WIRE RODS
Alton,Ill. L1 4.70
AlabamaCity,Ala. R2 4.325
Buffalo W12 4.325
Cleveland A7 4.325
Donora,Pa. A7 4.325
Fairfield,Ala. T2 4.325
Fontana,Calif. K1 5.125
Houston S5 4.725
Johnstown,Pa. B2 4.325
Joliet,Ill. A7 4.325
KansasCity,Mo. S5 4.663
LosAngeles B3 5.125
Minnequa,Colo. C10 4.675
Monessen,Pa. P7 4.525
No.Tonawanda,N.Y. B11 4.325
Pittsburg,Calif. C11 4.975
Portsmouth,O. P12 4.525
Roebling,N.J. R5 4.425
So.Chicago,Ill. R2 4.325
SparrowsPoint,Md. B2 4.425
Sterling,Ill.(1) N15 4.325
Struthers,O. Y1 4.325
Torrance,Calif. C11 5.125
Worcester,Mass. A7 4.625

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 4.675
Lackawanna,N.Y. B2 4.675
Munhall,Pa. U5 4.675
So.Chicago,Ill. U5 4.675

STRUCTURALS
Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 3.85
Aliquippa,Pa. J5 3.85
Bessemer,Ala. T2 3.85
Bethlehem,Pa. B2 3.90
Clairton,Pa. U5 3.85
Fairfield,Ala. T2 3.85
Fontana,Calif. K1 4.45
Gary,Ind. U5 3.85
Geneva,Utah C11 3.85
Houston S5 4.25
Ind.Harbor,Ind. I-2 3.85
Johnstown,Pa. B2 3.90
Kan.sasCity,Mo. S5 4.45
Lackawanna,N.Y. B2 3.90
LosAngeles B3 4.45
Minnequa,Colo. C10 4.30
Munhall,Pa. U5 3.85
Niles,Calif.(22) P1 4.56
Phoenixville,Pa. P4 6.10
Seattle B3 4.50
So.Chicago,Ill. U5, W14 3.85
So.SanFrancisco B3 4.40
Torrance,Calif. C11 4.45
Weirton,W.Va. W6 4.10

Wide Flange
Bethlehem,Pa. B2 3.90
Clairton,Pa. U5 3.85
Fontana,Calif. K1 4.85
Johnstown,Pa. B2 3.90
Lackawanna,N.Y. B2 3.90
Munhall,Pa. U5 3.85
So.Chicago,Ill. U5 3.85

Alloy Stand. Shapes
Clairton,Pa. U5 4.725
Fontana,Calif. K1 5.925
Gary,Ind. U5 4.725
Munhall,Pa. U5 4.725
So.Chicago,Ill. U5 4.725

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 5.80
Bessemer,Ala. T2 5.80
Bethlehem,Pa. B2 5.80
Clairton,Pa. U5 5.80
Fairfield,Ala. T2 5.80
Fontana,Calif. K1 6.40
Gary,Ind. U5 5.80
Geneva,Utah C11 5.80
Ind.Harbor,Ind. I-2 5.80
Ind.Harbor,Ind. Y1 6.30
Johnstown,Pa. B2 5.80
Lackawanna,N.Y. B2 5.80
LosAngeles B3 6.35
Munhall,Pa. U5 5.80
Seattle B3 6.40
So.Chicago,Ill. U5 5.80
So.SanFrancisco B3 6.30
Struthers,O. Y1 6.30

H.S., L.A. Wide Flange
Aliquippa,Pa. J5 5.50
Bethlehem,Pa. B2 5.80
Lackawanna,N.Y. B2 5.80
Munhall,Pa. U5 5.75
So.Chicago,Ill. U5 5.75

BEARING PILES
Munhall,Pa. U5 3.85
So.Chicago,Ill. U5 3.85

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 5.95
Bessemer,Ala. T2 5.95
Clairton,Pa. U5 5.95
Cleveland A,R2 5.95
Conshohocken,Pa. A3 6.20
Ecorse,Mich. G5 6.90
Fairfield,Ala. T2 5.95
Fontana,Calif.(30) K1 6.55
Gary,Ind. U5 5.95
Geneva,Utah C11 5.95
Ind.Harbor,Ind. I-2 5.95
Ind.Harbor,Ind. Y1 6.45
Johnstown,Pa. B2 5.95
Munhall,Pa. U5 5.95
Pittsburgh J5 5.95
Seattle B3 6.85
Sharon,Pa. S3 5.95
So.Chicago,Ill. U5 5.95
SparrowsPoint,Md. B2 5.95
Warren,O. R2 5.95
Youngstown Y1 6.45
Youngstown U5 5.95

PLATES, Open-Hearth Alloy
Claymont,Del. C22 5.35
Coatesville,Pa. L7 5.75
Conshohocken,Pa. A3 5.95
Fontana,Calif. K1 6.20
Gary,Ind. U5 5.25
Johnstown,Pa. B2 5.25
Munhall,Pa. U5 5.25
Sharon,Pa. S3 5.70
So.Chicago,Ill. U5 5.25
SparrowsPoint,Md. B2 5.25

FLOOR PLATES
Cleveland J5 4.95
Conshohocken,Pa. A3 4.95
Ind.Harbor,Ind. I-2 4.95
Munhall,Pa. U5 4.95
So.Chicago,Ill. U5 4.95

PLATES, Ingot Iron
Ashland,c.l.(15) A10 4.15
Cleveland,c.l. R2 4.50
Warren,O.,c.l. R2 4.50

PLATES, Carbon Steel
AlabamaCity,Ala. R2 3.90
Aliquippa,Pa. J5 3.90
Clairton,Pa. U5 3.90
Claymont,Del. C22 4.35
Cleveland J5, R2 3.90
Coatesville,Pa. L7 4.35
Conshohocken,Pa. A3 4.35
Ecorse,Mich. G5 4.45
Fairfield,Ala. T2 3.90
Fontana,Calif.(36) K1 4.50
Gary,Ind. U5 3.90
GraniteCity,Ill. G4 4.60
Geneva,Utah C11 3.90
Harrisburg,Pa. C5 6.50
Houston S5 4.30
Ind.Harbor,Ind. I-2, Y1 3.90
Johnstown,Pa. B2 3.90
Lackawanna,N.Y. B2 3.90
Minnequa,Colo. C10 4.70
Munhall,Pa. U5 3.90
Pittsburgh J5 3.90
Seattle B3 4.80
Sharon,Pa. S3 4.15
So.Chicago,Ill. U5, W14 3.90
SparrowsPoint,Md. B2 3.90
Steubenville,O. W10 3.90
Warren,O. R2 3.90
Weirton,W.Va. W6 4.20
Youngstown R2, U5, Y1 3.90

PLATES, Carbon A.R.
Fontana,Calif. K1 5.65
Geneva,Utah C11 5.65

PLATES, Wrought Iron
Economy,Pa. B14 8.60

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 3.95
Aliquippa,Pa. J5 3.95
Alton,Ill. L1 4.10
Atlanta,Ga. A11 4.50
Bessemer,Ala. T2 3.95
Buffalo R2 3.95
Canton,O. R2 3.95
Clairton,Pa. U5 3.95
Cleveland R2 3.95
Detroit R7 4.10
Ecorse,Mich. G5 4.30
Emeryville,Calif. J7 4.70
Fairfield,Ala. T2 3.95
Fontana,Calif. K1 4.65
Gary,Ind. U5 3.95
Houston S5 4.35
Ind.Harbor,Ind. I-2, Y1 3.95
Johnstown,Pa. B2 3.95
KansasCity,Mo. S5 4.55
Lackawanna,N.Y. B2 3.95
LosAngeles B3 4.65
Milton,Pa. B6 4.55
Minnequa,Colo. C10 4.40
Niles,Calif. P1 4.65
N.Tonawanda,N.Y. H11 3.95
Pittsburg,Calif. C11 4.65
Pittsburgh J5 3.95
Seattle B3, N14 4.70
So.Chicago R2,U5,W14 3.95
So.Duquesne,Pa. U5 3.95
So.SanFran.,Cal. B3 4.70
Sterling,Ill. N15 4.55
Struthers,O. Y1 3.95
Torrance,Calif. C11 4.65
Weirton,W.Va. W6 4.10
Youngstown R2, U5 3.95

BAR SIZE ANGLES, S. Shapes
Aliquippa,Pa. J5 3.95
Atlanta,A11 4.50
Niles,Calif. P1 4.65
SanFrancisco S7 5.00

BAR SIZE ANGLES, H.R CARBON
Bethlehem,Pa. B2 4.15

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 4.675
Buffalo R2 4.675
Canton,O. R2 4.675
Canton,O. T7 4.72
Clairton,Pa. U5 4.675
Detroit R7 4.825
Ecorse,Mich. G5 5.025
Fontana,Calif. K1 5.725
Gary,Ind. U5 4.675
Houston S5 5.075
Ind.Harbor,Ind. I-2, Y1 4.675
Johnstown,Pa. B2 4.675
KansasCity,Mo. S5 5.275
Lackawanna,N.Y. B2 4.675
LosAngeles B3 5.725
Massillon,O. R2 4.675
Minnequa,Colo. C10 4.90
Midland,Pa. C18 4.90
So.Chicago R2,U5,W14 4.675
So.Duquesne,Pa. U5 4.675
Struthers,O. Y1 4.675
Warren,O. C17 4.675
Youngstown U5 4.675

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 4.925
Gary,Ind. U5 4.925
Youngstown U5 4.925

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 5.925
Bessemer,Ala. T2 5.925
Bethlehem,Pa. B2 5.925
Clairton,Pa. U5 5.925
Cleveland R2 5.925
Ecorse,Mich. G5 6.625
Fairfield,Ala. T2 5.925
Fontana,Calif. K1 6.925
Gary,Ind. U5 5.925
Ind.Harbor,Ind. I-2 5.925
Johnstown,Pa. B2, Y1 5.925
Lackawanna,N.Y. B2 5.925
LosAngeles B3 6.625
Pittsburgh J5 5.925
Seattle B3 6.625
So.Duquesne,Pa. U5 5.925
So.SanFrancisco B3 6.675
Struthers,O. Y1 6.425
Youngstown U5 5.925

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 4.925
BeaverFalls,Pa. R2 4.925
BeaverFalls,Pa. M12 4.925
Buffalo B5 4.675
Camden,N.J. P13 4.75
Carnegie,Pa. C12 4.925
Chicago B6 4.925
Chicago W18 4.925
Cleveland A7, C20 4.925
Detroit P17, R7 5.025
Donora,Pa. A7 4.925
Elyria,O. W18 4.925
Fontana,Calif. K1 4.925
Franklin Park,Ill. N5 4.925
Gary,Ind. R2 4.925
GreenBay,Wis. F7 4.925
Hammond,Ind. L2, M13 4.925
Hartford,Conn. R2 5.475
LosAngeles R2 6.375
Mansfield,Mass. B5 5.475
Massillon,O. R2, R8 4.925
Monaca,Pa. S17 4.925
Newark,N.J. W18 5.375
Plymouth,Mich. P5 5.175
Pittsburgh J5 4.925
Putnam,Conn. W18 5.475
Readville,Mass. C14 5.475
St.Louis,Mo. M5 5.30
So.Chicago,Ill. W14 4.925
SpringCity,Pa. K3 5.375
Struthers,O. Y1 4.925
Waukegan,Ill. A7 4.925
Youngstown Y1 4.925
Youngstown F3 4.925

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 6.00
BeaverFalls,Pa. M12 6.00
Bethlehem,Pa. B2 6.00
Buffalo B5 6.00
Camden,N.J. P13 6.40
Canton,O. R2 6.00
Canton,O. T7 5.90
Carnegie,Pa. C12 6.00
Chicago B6 6.00
Chicago W18 6.00
Cleveland A7 6.00
Cleveland C20 6.00
Detroit P17, R7 6.10
Donora,Pa. A7 6.00
Elyria,O. W18 6.00
Gary,Ind. R2 6.00
Hammond,Ind. L2, M13 6.00
Hartford,Conn. R2 6.45
Lackawanna,N.Y. B2 6.00
Mansfield,Mass. B5 6.45
Massillon,O. R2, R8 6.00
Midland,Pa. C18 6.00
Monaca,Pa. S17 6.00
Newark,N.J. W18 6.35
Plymouth,Mich. P5 6.20
So.Chicago,Ill. R2, W14 6.00
SpringCity,Pa. K3 6.20
Struthers,O. Y1 6.00
Warren,O. C17 6.00
Waukegan,Ill. A7 6.05
Worcester,Mass. A7 6.35
Youngstown Y1 6.00
Youngstown F3 6.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 3.95
Atlanta,A11 4.50
Buffalo R2 3.95
Cleveland R2 3.95
Emeryville,Calif. J7 4.70
Fairfield,Ala. T2 3.95
Fontana,Calif. K1 4.65
Gary,Ind. U5 3.95
Houston S5 4.55
Ind.Harbor,Ind. I-2, Y1 3.95
Johnstown,Pa. B2 3.95
KansasCity,Mo. S5 4.55
Lackawanna,N.Y. B2 3.95
LosAngeles B3 4.65
Milton,Pa. B6 4.55
Minnequa,Colo. C10 4.75
Pittsburgh J5 3.95
Pittsburg,Calif. C11 4.65
Pittsburgh J5 3.95
SandSprings,Okla. S5 4.55
Seattle B3, N14 4.70
So.Chicago,Ill. R2 3.95
So.Duquesne,Pa. U5 3.95
So.SanFrancisco B3 4.70
SparrowsPoint,Md. B2 3.95
Sterling,Ill.(1) N15 4.70
Struthers,O. Y1 3.95
Torrance,Calif. C11 4.65
Youngstown R2, U5 3.95

BARS, Reinforcing
(Fabricated to Consumers)
Huntington,W.Va. W7 5.50
Johnstown,¾ to 1" B2 4.75
LosAngeles B3 5.45
Marion,O. P11 5.25
Seattle B3, N14 5.80
So.SanFrancisco B3 5.45
SparrowsPt.,¾-1" B2 4.75
Williamsport,Pa. S19 5.10

RAIL STEEL BARS
Chicago Hts.(3,4) C22 4.75
Chicago Hts.(3,4 to 1-2 4.75
Franklin Pa.(3,4) F5 4.75
FortWorth,Tex.(26) T6 5.10
Huntngt.W.Va.(3) W7 5.75
Marion,O.(3) P11 4.75
Moline,Ill.(3) R2 4.65
Tonawanda(3,4) B12 5.00
Williamsport(3) S19 5.25
Williamsport(4) S19 5.35

BARS, Wrought Iron
(Add 4.7% to base and extras)
Economy Pa.(S.R.) B14 9.60
Economy Pa.(D.R.) B14 11.90
Economy Staybolt) B14 12.20
McK Rks.(Staybolt) L5 14.50
McK Rks.(S.R.) L5 9.60
McK Rks.(D.R.) L5 13.00

SHEETS, Hot-Rolled Steel
(18 gage and heavier)
AlabamaCity,Ala. R2 3.775
Ashland,Ky.(8) A10 3.775
Butler,Pa. A10 3.775
Cleveland J5, R2 3.775
Conshohocken,Pa. A3 4.175
Detroit M1 4.40
Ecorse,Mich. G5 3.975
Fairfield,Ala. T2 3.775
Fontana,Calif. K1 4.725
Gary,Ind. U5 3.775
Geneva,Utah C11 3.875
GraniteCity,Ill. G4 4.30
Ind.Harbor,Ind. I-2, Y1 3.775
Irvin,Pa. U5 3.775
Lackawanna,N.Y. B2 3.775
Munhall,Pa. U5 3.775
Niles,O. N12 4.425
Pittsburg,Calif. C11 4.675
Pittsburgh J5 3.775
Sharon,Pa. S3 4.175
So.Chicago,Ill. W14 3.775
SparrowsPoint,Md. B2 3.775
Steubenville,O. W10 3.775
Torrance,Calif. C11 4.675
Warren,O. R2 3.775
Weirton,W.Va. W6 3.775
Youngstown U5, Y1 3.775

SHEETS, H.R. (19 gage)
AlabamaCity,Ala. R2 4.025
Dover,O. B11 5.675
Fairfield,O. E6 5.65
Niles,O. N12 5.675
Torrance,Calif. C11 5.575

SHEETS, H.R. (14 ga., heavier)
High-Strength Low-Alloy
Cleveland J5, R2 5.675
Conshohocken,Pa. A3 5.925
Ecorse,Mich. G5 6.225
Fairfield,Ala. T2 5.675
Fontana,Calif. K1 6.625
Gary,Ind. U5 5.675
Ind.Harbor,Ind. I-2 5.675
Ind.Harbor,Ind. Y1 5.775
Irvin,Pa. U5 5.675
Lackawanna(35) B2 5.675
Munhall U5 5.675
Pittsburgh J5 5.675
Sharon,Pa. S3 5.675
So.Chicago,Ill. U5 5.675
Sparrow Point(36) B2 5.675
Warren,O. R2 5.675
Weirton,W.Va. W6 6.025
Youngstown U5 5.675
Youngstown Y1 5.775

SHEETS, Cold-Rolled
High-Strength Low-Alloy
Cleveland J5, R2 6.925
Ecorse,Mich. G5 7.475
Fontana,Calif. K1 7.925
Gary,Ind. U5 6.925
IndianaHarbor,Ind. Y1, I-2 6.925
IndianaHarbor,Ind. I-2 6.925
Irvin,Pa. U5 6.925
Lackawanna(37) B2 6.925
Pittsburgh J5 6.925
SparrowsPoint(38) B2 6.925
Warren,O. R2 6.925
Weirton,W.Va. W6 7.275
Youngstown Y1 7.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.575
Cleveland J5, R2	4.575
Ecorse,Mich. G5	4.775
Fairfield,Ala. T2	4.575
Follansbee,W.Va. F4	5.575
Fontana,Calif. K1	5.525
Gary,Ind. U5	4.575
GraniteCity,Ill. G4	5.275
Ind.Harbor,Ind. I-2,Y1	4.575
Irvin,Pa. U5	4.575
Lackawanna,N.Y. B2	4.575
Middletown,O. A10	4.575
Pittsburg,Calif. C11	5.525
Pittsburgh,J5	4.575
SparrowsPoint,Md. B2	4.575
Steubenville,O. W10	4.575
Warren,O. R2	4.575
Weirton,W.Va. W6	4.575
Youngstown, Y1	4.575

SHEETS, Galv'd No. 10 Steel

Alabama City,Ala. R2	5.075
Ashland,Ky.(8) A10	5.075
Canton,O. R2	5.075
Delphos,O. N16	5.675
Dover,O. R1	5.775
Fairfield,Ala. T2	5.075
Gary,Ind. U5	5.075
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. I-2	5.075
Irvin,Pa. U5	5.075
Kokomo,Ind.(13) C16	5.475
MartinsFerry,O. W10	5.075
Niles,O. N12	6.275
Pittsburg,Calif. C11	5.825
SparrowsPoint,Md. B2	5.075
Steubenville,O. W10	5.075
Torrance,Calif. C11	5.825
Weirton,W.Va. W6	5.075

SHEETS, Galvanized No. 10, High Strength Low-Alloy

Irvin,Pa. U5	7.625
SparrowsPoint(39), B2	7.775

SHEETS, Galvannealed Steel

Canton,O. R2	5.625
Irvin,Pa. U5	5.625
Kokomo,Ind.(13) C16	6.025
Niles,O. N12	6.825

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.325
Middletown,O. A10	5.325

SHEETS, Electro Galvanized

Cleveland,R2 (28)	5.925
Niles,O. R2 (28)	5.925
Weirton,W.Va. W6	5.775

SHEETS, Wall Casing

Fontana,Calif. K1 (43)	5.10
Torrance,Calif. C11	5.275

BLUED Stock, 29 ga

Yorkville,O. W10	7.00
Follansbee,W.Va. F4	7.10
Follansbee (23) F4	6.425

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.925
Cleveland,R2	4.925
Gary,Ind. U5	4.925
GraniteCity,Ill. G4	5.625
Ind.Harbor,Ind. I-2	4.925
Irvin,Pa. U5	4.925
Middletown,O. A10	4.925
Youngstown, Y1	4.925

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.40	$7.65	$8.05
Fairfield,Ala. T2	7.50	7.75	8.15
Gary,Ind. U5	7.40	7.65	8.05
GraniteCity,Ill. G4	7.60	7.85	8.25
Indiana Harbor,Ind. I-2, Y1	7.40	7.65	8.05
Irvin,Pa. U5	7.40	7.65	8.05
Niles,O. R2	7.40		
Pittsburg,Calif. C11	8.15	8.40	8.80
SparrowsPoint,Md. B2	7.50	7.75	8.15
Weirton,W.Va. W6	7.40	7.65	8.05
Yorkville,O. W10	7.40	7.65	8.05

SHEETS, SILICON, H.R. or C.R. COILS (Cut lengths 1/2c lower)

	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.10 (cut lengths)			7.85	9.10	9.90
Brackenridge,Pa. A4			7.75	9.00	9.80
GraniteCity,Ill. G4 (cut lengths)			8.55	9.80	
IndianaHarbor,Ind. I-2	7.55	7.85	(34)	(41)	
Mansfield,O. E6 (cut lengths)	7.20	7.35	7.85	9.10	9.90
Niles,O. N12 (cut lengths)	7.05	7.35	7.85		
Vandergrift,Pa. U5		7.55	8.35	9.60	10.40
Warren,O. R2	7.55	7.85	8.35	9.60	10.40
Zanesville,O. A10		7.85	8.35	9.60	10.40

SHEETS, SILICON (22 Ga. Base) COILS (Cut Lengths 1/2c lower)

Transformer Grade	72	65	58	52
BeechBottom,W.10 (cut lengths)	10.45	11.00	11.70	12.50
Brackenridge,Pa. A4	10.35			
Vandergrift,Pa. U5	10.95	11.50	12.20	13.00
Warren,O. R2	10.95			
Zanesville,O. A10	10.95	11.50	12.20	13.00

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)

	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)			15.35	15.85
Vandergrift,Pa. U5	13.50	14.35	15.35	15.85

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$4.25
Fairfield,Ala. T2	4.60
Gary,Ind. U5	4.50
GraniteCity,Ill. G4	4.70
Ind.Harbor,Ind. I-2, Y1	4.50
Irvin,Pa. U5	4.50
Niles,O. R2	4.50
Pittsburg,Calif. C11	7.25
SparrowsPoint,Md. B2	4.60
Warren,O. R2	4.50
Weirton,W.Va. W6	4.50
Yorkville,O. W10	4.50

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	6.10
Gary,Ind. U5	6.10
GraniteCity,Ill. G4	6.30
Ind.Harbor,Ind. Y1	6.10
Irvin,Pa. U5	6.10
Yorkville,O. W10	6.35

SHEETS, Culvert No. 16

	Cu	Cu Fe
Ashland,Ky. A10	5.875	....
Canton,O. R2	5.925	6.375
Fairfield,Ala. T2	5.875	6.125
Gary,Ind. U5	5.875	6.125
Ind.Harbor,Ind. I-2	5.875	6.125
Irvin,Pa. U5	5.875	6.125
Kokomo,Ind. C16	6.525	....
MartinsFy.,O. W10	5.875	....
Pittsburg,Cal. C11	6.625	....
SparrowsPt.	5.875	....
Torrance,Cal. C11	6.625	....

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	6.125
Fairfield,Ala. T2	6.125
MartinsFerry,O. W10	6.125

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	4.025
Cleveland,R2	4.375
Ind.Harbor,Ind. I-2	4.025
Warren,O. R2	4.375

SHEETS, Cold-Rolled Ingot Iron

Butler,Pa. A10	5.075
Cleveland,R2	5.175
Middletown,O. A10	5.075
Warren,O. R2	5.175

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.325
Canton,O. R2	5.825

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.575
Middletown,O. A10	5.575

SHEETS, ALUMINIZED

Butler,Pa. A10	8.425

TINPLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.70	$8.95
Fairfield,Ala. T2	8.80	9.05
Gary,Ind. U5	8.70	8.95
Ind.Har. I-2, Y1	8.70	8.95
Irvin,Pa. U5	8.70	8.95
Pitts.,Cal. C11	9.45	9.70
Sp.Pt. Md. B2	8.80	9.05
Warren,O. R2	8.70	
Weirton,W.Va. W6	8.70	8.95
Yorkville,O. W10	8.70	8.95

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.85
Gary,Ind. U5	7.75
Irvin,Pa. U5	7.75
Yorkville,O. W10	7.75

SHEETS, LT. Coated Ternes, 6 lb

Yorkville,O. W10	$8.65

SHEET, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.75
Yorkville,O. W10	9.75

SHEET, Long Terne Steel (Commercial Quality)

Beech Bottom,W.Va. W10	5.475
Gary,Ind. U5	5.475
Mansfield,O. E6	6.05
Middletown,O. A10	5.475
Niles,O. N12	6.275
Weirton,W.Va. W6	5.475

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.875

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.75

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	5.65
Conshohocken,Pa. A3	5.90
Ecorse,Mich. G5	6.30
Fairfield,Ala. T2	5.65
Fontana,Calif. K1	6.55
Gary,Ind. U5	5.65
Ind.Harb.,Ind. I-2	5.65
Ind.Harbor,Ind. Y1	6.15
Lackawanna,N.Y. B2	5.70
LosAngeles(25) B3	6.40
Seattle(25) B3	6.65
Sharon,Pa. S3	5.65
So.SanFrancisco(25) B3	6.40
Sparrow's Point,Md. B2	5.70
Warren,O. R2	5.65
Weirton,W.Va. W6	6.10
Youngstown Y1	6.15
Youngstown U5	5.65

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland,J5	7.45
Cleveland,A7	7.30
Dover,O. G6	8.60
Ecorse,Mich. G5	8.15
Lackawanna,N.Y. B2	7.90
Sharon,Pa. S3	7.30
SparrowsPoint,Md. B2	7.90
Warren,O. R2	7.30
Weirton,W.Va. W6	7.95
Youngstown Y1	7.80

STRIP, Hot-Rolled Carbon

Ala.City,Ala. (27) R2	3.725
Alton,Ill. L1	4.20
Ashland,Ky.(8) A10	3.725
Atlanta,A11	4.275
Bessemer,Ala. T2	3.725
Bridgeport,Conn.(10) S15	4.225
Buffalo(27), R2	3.725
Butler,Pa. A10	3.725
Carnegie,Pa. S18	4.225
Conshohocken,Pa. A3	4.125
Detroit,M1	4.40
Ecorse,Mich. G5	4.025
Fairfield,Ala. T2	3.725
Fontana,Calif. K1	4.975
Gary,Ind. U5	3.725
Houston,Tex. S5	4.125
Ind.Harbor,Ind. I-2,Y1	3.725
Johnstown,Pa.(25) B2	3.725
Kansas City,Mo.(9) S5	4.325
Lackawna,N.Y.(32) B2	3.725
LosAngeles(25) B3	4.475
Milton,Pa. B6	4.35
Minnequa,Colo. C10	4.775
NewBritain(10) S15	4.225
N.Tonawanda,N.Y. B11	3.725
Pittsburg,Calif. C11	4.475
Riverdale,Ill. A7	3.725
SanFrancisco S7	5.00
Seattle(25) B3	4.725
Seattle N14	4.75
Sharon,Pa. S3	4.225
So.Chicago,Ill. W14	3.725
So.SanFrancisco(25) B3	4.475
SparrowsPoint,Md. B2	3.725
Sterling,Ill. N15	4.225
Torrance,Calif. C11	4.475
Warren,O. R2	3.725
Weirton,W.Va. W6	3.825
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.725

STRIP, Hot-Rolled Alloy

Bridgeprt.Conn.(10) S15	6.05
Carnegie,Pa. S18	6.45
Fontana,Calif. K1	7.30
Gary,Ind. U5	6.10
Houston,Tex. S5	6.50
Kansas City,Mo. S5	6.70
Midland,Pa. C18	5.85
Niles,Ohio,Conn.(10) S15	6.05
Sharon,Pa. S3	6.45
Youngstown U5	6.10

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Bridgeprt,Conn.(10) S15	5.80
Butler,Pa. A10	5.10
Cleveland A7, J5	5.10
Dearborn,Mich. D3	6.05
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	5.30
Follansbee,W.Va. F4	5.10
Fontana,Calif. K1	6.75
Franklin Park,Ill.(40) T6	5.35
Ind.Harbor,Ind. I-2	5.35
Lackawanna,N.Y. B2	5.10
LosAngeles C1	6.85
Mattapan,Mass. T6	5.95
Middletown,O. A10	5.10
NewBritain(10) S15	5.80
New Castle,Pa. B4	5.80
NewCastle,Pa.(40) E5	5.70
NewHaven,Conn. D2	5.85
NewHaven,Conn. A7	5.60
Pawtucket,R.I. R3	6.45
Pawtucket,R.I.(21) N8	6.30
Riverdale,Ill.(40) A1	5.35
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.80
SparrowsPoint,Md. B2	5.10
Trenton,N.J. R5	6.45
Wallingford,Conn. W2	6.30
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown C8 (40)	5.70
Youngstown Y1	5.10

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	*5.70*
Weirton,W.Va. W6	5.10
Youngstown C8	5.70

STRIP, Cold-Rolled Alloy Steel

Bridgeprt.Conn.(10) S15	12.15
Carnegie,Pa. S18	12.00
Cleveland A7	11.40
Dover,O. G6	11.90
Fontana,Calif. K1	13.05
Harrison,N.J. C18	*12.00*
Midland,Pa. C18	*12.00*
NewBritn.Conn.(10) S15	12.15
Pawtucket,R.I.(11) N8	12.15
Pawtucket,R.I.(12) N8	12.45
Sharon,Pa. S3	12.00
Worcester,Mass. A7	11.70
Youngstown C8	12.00

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.975
Warren,O. R2	4.325

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	5.70

TIGHT COOPERAGE HOOP

Atlanta,A11	4.45
Riverdale,Ill. A1	4.30
Sharon,Pa. S3	4.55
Youngstown U5	4.15

STRIP, Cold-Finished, Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7		7.65	8.25	10.20	12.50
Bridgeport,Conn.(10) S15	5.80	7.65	8.25	10.20	12.50
Bristol,Conn. W1			8.55	10.50	
Carnegie,Pa. S18		7.65	8.25	10.20	12.50
Cleveland,A7	5.10	7.30	8.25	10.20	12.50
Dearborn,Mich. D3	6.05	7.90	8.50		
Detroit D2	6.45	7.50	8.10		
Dover,O. G6	5.70	7.65	8.25	10.20	12.50
FranklinPark,Ill. T6	5.45	7.45	8.40	10.35	12.65
Harrison,N.J. C18			*8.55*	*10.50*	*12.80*
Mattapan,Mass. T6	5.95	7.60	8.55	10.50	12.80
NewBritn.,Conn.(10) S15	5.80	7.65	8.25	10.20	12.50
NewCastle,Pa. B4	5.80	7.65	8.25	10.20	
NewCastle,Pa. E5	5.80	7.65	8.25	10.20	12.80
NewHaven,Conn. D2	6.70	7.60	8.20		
NewYork W3		7.95	8.55	10.50	12.80
Pawtucket,R.I. N8: Cleve.orPitts Base		7.65	8.25	10.20	12.50
Worcester,Mass. Base	6.30	7.95	8.55	10.50	12.80
Sharon,Pa. S3	5.80	7.65	8.25	10.20	12.50
Trenton,N.J. R5		7.95	8.55	10.50	12.80
Wallingford,Conn. W2	6.30	7.60	8.20	10.15	12.65
Warren,O. T5	*6.20*	*7.65*	*8.25*	*10.20*	*12.50*
Weirton,W.Va. W6	5.80	7.65	8.25	10.20	12.50
Worcester,Mass. A7	5.40	7.60	8.55	10.50	12.80
Worcester,Mass. T6	5.95	7.60	8.55	10.50	12.80
Youngstown C8		7.65	8.25	10.20	12.50

Spring Steel (Tempered)

Trenton,N.J. R5 (29)			10.30	12.50	15.35
Harrison,N.J. C18			10.30	12.50	15.35
NewYork W3			10.30*	12.50*	15.35*
Youngstown C8			10.30	12.50	15.35

* Plus $1.575 per 100 lb.

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B5 Blair Strip Steel Co.
B6 Bliss & Laughlin Inc.
B7 Bolardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Div., H.K. Porter Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire

G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div. Borg-Warner Corp.
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

WIRE, Merchant Quality

(6 to 8 gage)	An'ld.	Galv.
AlabamaCity R2	6.075	6.325
Aliquippa J5	6.075	6.45*
Atlanta A11	6.325	6.575
Bartonville(19) K4	*6.075*	*6.40*
Buffalo W12	5.225	
Cleveland A7	6.075	6.225
Crawfordsville M8	6.175	6.55
Donora,Pa. A7	6.075	6.225
Duluth,Minn. A7	6.075	6.225
Fairfield T2	6.075	6.675
Houston,Tex S5	6.475	6.625
Johnstown B2	6.075	6.45†
Joliet,Ill. A7	6.075	6.225
KansasCy,Mo S5	6.675	6.825
Kokomo C16	6.175	6.425
LosAngeles B3	7.025	
Minnequa,C10	6.325	6.70*
Monessen,Pa P7	*6.075*	*6.45*
Palmer W12	5.525	
Pitts.,Calif. C11	7.025	7.175
Prtsmth.(18)P12	6.475	
Rankin A7	6.075	6.225
So Chicago R2	6.075	6.325
So S.Fran. C10	7.025	7.40*
SparrowsPt. B2	6.175	6.55†
Sterling,Ill.(1)N15	*6.075*	*6.425*
Struthers,O. Y1	6.075	6.475
Torrance,Cal. C11	7.025	
Worcester A7	6.375	6.525

*Based on 14-cent zinc; †14.50-cent zinc.

ROPE WIRE

	(A)
Alton,Ill. L1	9.15
Bartonville,Ill. K4	8.95
Buffalo W12 (43)	8.55
Fostoria,O. S1 (43)	8.55
Johnstown,Pa. B2 (43)	8.55
Monessen,Pa. P16 (43)	8.55
Monessen,Pa. P7 (43)	8.80
Muncie,Ind. I-7 (43)	8.75
Palmer,Mass. W12 (43)	8.85
Portsmouth,O. P12 (43)	8.55
Roebling,N.J. R5 (43)	8.85
SparrowsPt, B2 (43)	8.65
Struthers,O. Y1 (43)	8.55
Worcester J4, T6 (43)	8.85

(A) Plow and Mild Plow; add 0.25c for improved plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	5.225
Aliquippa,Pa. J5 (42)	4.85
Atlanta A11	5.475
Alton,Ill. L1	5.45
Bartonville,Ill. K4	5.325
Buffalo W12	5.225
Chicago W13	5.475
Cleveland A7, C20	5.225
Crawfordsville,Ind. M8	5.325
Donora,Pa. A7	5.225
Duluth,Minn. A7	5.225
Fairfield,Ala. T2	5.225
Fostoria,O.(24) S1	5.725
Houston S5	5.625
Johnstown,Pa. B2	5.225
Joliet,Ill. A7	5.225
KansasCity,Mo. S5	5.825
Kokomo,Ind. C16	5.325
LosAngeles B3	6.175
Minnequa,Colo. C10	5.475
Monessen,Pa. P7	*5.47*
Newark 6-8 ga. I-1	5.88
No.Tonawanda B11	5.225
Palmer,Mass. W12	5.525
Pittsburg,Calif. C11	6.175
Portsmouth,O. P12	5.225
Rankin,Pa. A7	5.225
So.Chicago,Ill. R2	5.225
So.SanFrancisco C10	6.175
SparrowsPoint,Md. B2	5.325
Sterling,Ill.(1) N15	5.225
Struthers,O. Y1	5.225
Torrance,Calif. C11	5.225
Worcester A7	5.225

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	6.20
Buffalo W12 (43)	6.35
Cleveland A7 (43)	5.85
Crawfordsville,Ind. M8(43)	5.85
Dover,O. G6	6.20
Fostoria,O. S1 (43)	6.00
Kokomo,Ind. C16 (43)	5.70
FranklinPark,Ill. T6(43)	6.20
Massillon,O. R8 (43)	5.85
Monessen,Pa. P16 (43)	6.35
Monessen,Pa. P7 (43)	*6.10*
Pawtkt.R.I.(12) N8 (43)	6.85
Trenton,N.J. R5 (43)	6.15
Worcester,Mass. A7(43)	6.15
Worcester,Mass. T6(43)	6.50
Worcester,Mass.W12 (43)	6.65

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	8.90
Monessen,Pa. P16 (43)	8.50
Muncie,Ind. I-7 (43)	8.70
Roebling,N.J. R5 (43)	8.80
SparrowsPt.,Md. B2 (43)	8.60
Johnstown,Pa. B2 (43)	8.50

WIRE (16 gage)

(Add 4.7% on base and extras)	An'ld.	Galv. Stone
Aliquippa J5	10.15	12.15
Bartonville(19)K4	10.25	12.00*
Cleveland A7	10.25	11.55
Crawfrdsville M8	10.25	12.00
Fostoria,O. S1	10.40	13.00
Johnstown B2	10.73	12.58†
Kokomo C16	10.625†	12.325†
Minnequa C10	10.40	12.425*
Palmer,Mass.W12	10.25	12.15
Pitts.,Cal. C11	10.60	11.90
SparrowsPt. B2	10.84	12.68†
Waukegan A7	10.25	11.55
Worcester A7		11.85

*Based on 14-cent; $14.50 cent zinc. †Includes 4.7% increase.

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 (43)	6.25
Alton,Ill. L1	6.85
Bartonville,Ill. K4	6.64
Buffalo W12 (43)	6.25
Cleveland A7 (43)	6.25
Donora,Pa. A7 (43)	6.25
Duluth,Minn. A7 (43)	6.25
Fostoria,O. S1 (43)	6.25
Johnstown,Pa. B2 (43)	6.25
Millbury,Mass. N6 (43)	8.05
Minnequa,Colo. C10(43)	6.50
Monessen,Pa. P7 (43)	6.25
Monessen,Pa. P16	6.75
Muncie,Ind. I-7 (43)	6.45
Palmer,Mass. W12 (43)	6.55
Pittsburg,Calif. C11(43)	7.20
Roebling,N.J. R5 (43)	6.55
Portsmouth,O. P12(43)	6.25
So.Chicago,Ill. R2 (43)	6.25
So.SanFran. C10 (43)	7.20
SparrowsPt.,Md. B2 (43)	6.35
Struthers,O. Y1 (43)	6.25
Trenton,N.J. A7 (43)	6.55
Waukegan,Ill. A7 (43)	6.25
Worcester A7, T6 (43)	6.55
Worcester,Mass. W12(43)	6.55
Worcester,Mass. J4 (43)	6.75

WIRE, Tire Bead

Bartonville,Ill. K4	11.51
Monessen,Pa. P16 (43)	11.40
Roebling,N.J. R5 (43)	11.55

WIRE, Fine & Weaving (8"Coils)

Bartonville,Ill. K4	9.42
Buffalo W12 (43)	8.90
Chicago W13	9.32
Cleveland A7 (43)	8.90
Crawf'sville,Ind. M8(43)	8.90
Fostoria,O. S1 (43)	8.90
Johnstown,Pa. B2 (43)	8.90
Kokomo,Ind. C16 (43)	8.90
Monessen,Pa. P16 (43)	8.90
Muncie,Ind. I-7 (43)	9.10
Palmer,Mass. W12 (43)	9.20
Roebling,N.J. R5 (43)	9.20
Waukegan,Ill. A7 (43)	8.90
Worcstr,Mass. A7,T6(43)	9.20

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	144
Aliquippa,Pa. J5	147*
Atlanta A11	149
Bartonville,Ill.(19) K4	*146*
Crawfordsville,Ind. M8	149
Donora,Pa. A7	142
Duluth,Minn. A7	142
Fairfield,Ala. T2	142
Houston,Tex S5	159
Johnstown,Pa. B2	147
Joliet,Ill. A7	142
KansasCity,Mo. S5	154
Kokomo,Ind. C16	149
Minnequa,Colo. C10	153*
Monessen,Pa. P7	*147*
Pittsburg,Calif. C11	162
Rankin,Pa. A7	142
So.Chicago,Ill. R2	144
So.SanFran.,Calif. C10	167*
SparrowsPoint,Md. B2	149
Sterling,Ill.(1) N15	*146*

*Based on 14-cent zinc

WIRE, Upholstery Spring

Aliquippa,Pa. J5	6.275
Alton,Ill. L1	6.50
Buffalo W12	6.275
Cleveland A7	6.275
Donora,Pa. A7	6.275
Duluth,Minn. A7	6.275
Johnstown,Pa. B2	6.275
Los Angeles B3	7.225
Minnequa,Colo. C10	6.523
Monessen,Pa. P7	*6.275*
Monessen,Pa. P16(42)	6.40
NewHaven,Conn. A7	6.575
Palmer,Mass. W12	6.375
Pittsburg,Calif. C11	7.225
Portsmouth,O. P12	6.275
Roebling,N.J. R5	6.375
So.Chicago,Ill. R2	6.275
So.SanFrancisco C10	7.225
SparrowsPoint,Md. B2	6.375
Torrance,Calif. C11	7.225
Trenton,N.J. A7	6.575
Waukegan,Ill. A7	6.275
Worcester,Mass. A7	6.575

WOVEN FENCE,9-15½ Ga. Col.

AlabamaCity,Ala. R2	135
Ala.City,Ala.,17-18ga.R2	222
Aliquippa,Pa.9-14½ga.J5	131
Atlanta A11	140
Bartonville,Ill.(19) K4	*147*
Crawfordsville,Ind. M8	140
Donora,Pa. A7	133
Duluth,Minn. A7	133
Fairfield,Ala. T2	133
Houston,Tex S5	141
Johnstown,Pa. B2	138
Johnstown,17ga.6" B2	229
Joliet,Ill. A7	133
KansasCity,Mo. S5	145
Kokomo,Ind. C16	140
Minnequa,Colo. C10	146*
Monessen,Pa. P7	*148*
Pittsburg,Calif. C11	158
Rankin,Pa. A7	133
So.Chicago,Ill. R2	135
Sterling,Ill.(1) N15	*147*

*Based on 14-cent zinc

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	132
Atlanta A11	135
Bartonville,Ill.(19) K4	132
Crawfordsville,Ind. M8	134
Donora,Pa. A7	132
Duluth,Minn. A7	132
Fairfield,Ala. T2	132
Joliet,Ill. A7	132
KansasCity,Mo. S5	144
Kokomo,Ind. C16	134
Minnequa,Colo. C10	137
Pittsburg,Calif. C11	156
So.Chicago,Ill. R2	132
So.SanFran.,Calif. C10	156
SparrowsPoint,Md. B2	134
Sterling,Ill.(1) N15	132

FENCE POSTS

ChicagoHts.,Ill. C2	140
Duluth,Minn. A7	133
Franklin,Pa. F5	140
Huntington,W.Va. W7	148
Johnstown,Pa. B2	138
Marion,O. P11	140
Minnequa,Colo. C10	138
Moline,Ill. R2	136
So.Chicago,Ill. R2	140
Tonawanda,N.Y. B12	148
Williamsport,Pa. S19	158

TRACK BOLTS (20) Treated

KansasCity,Mo. S5	9.85
Lebanon,Pa.(31) B2	9.85
Minnequa,Colo. C10	9.85
Pittsburgh O3, P14	9.85

AXLES

Indiana Harbor Ind. S13	5.65
Johnstown,Pa. B2	5.65

NAILS, Stock

To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2 (44)	118
Aliquippa,Pa. J5 (44)	118
Atlanta A11	130
Bartonville,Ill.(19) K4	127
Chicago,Ill. W13 (44)	118
Cleveland A9 (44)	125
Crawfordsville,Ind. M8	130
Donora,Pa. A7 (44)	118
Duluth,Minn. A7 (44)	118
Fairfield,Ala. T2 (44)	118
Galveston,Tex. D7 (44)	126
Houston,Tex. S5 (44)	126
Johnstown,Pa. B2 (44)	118
Joliet,Ill. A7 (44)	118
KansasCity,Mo. S5 (44)	130
Kokomo,Ind. C16	129
Minnequa,Colo. C10 (44)	123
Monessen,Pa. P7	*127*
Pittsburg,Calif. C11 (44)	137

RAILS

	Std. No. 1	Std. No. 2	All No. 2	60 lb Under
Bessemer,Pa. U5	3.775	3.675	3.725	4.25
Ensley,Ala. T2	3.775	3.675		4.25
Fairfield,Ala. T2				4.25
Gary,Ind. U5	3.775	3.675	3.725	5.25
Huntington,W.Va. W7				
IndianaHarbor,Ind. I-2	3.775	3.675	3.725	
Johnstown,Pa. B2				(16)4.25
Lackawanna,N.Y. B2	3.775	3.675		4.25
Minnequa,Colo. C10	$73.50*	$73.50*		4.75
Steelton,Pa. B2	3.775	3.675		
Williamsport,Pa. S19				5.00

*Per net ton.

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 18 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(15) ⅛" and thinner
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn., base.
(23) Ind. San Francisco Bay area.
(23) 20 Ga. 38" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 5.85c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Add $1.50 per ton.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. or square edge.
(33) To jobbers, deduct 30a.
(34) 7.85c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter; 60" & narrower.
(38) 16 gage & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.025" and heavier, 0.25c higher.
(41) 9 10c for cut lengths.
(42) Plus 0.375c per 100 lb.
(43) Plus 4.7% on base and extras.
(44) Plus 45c per 100 lb.
(45) Plus 40c per 100 lb.

TOOL STEEL

(Prices subject to 4.7% increase)

Grade	$ per lb
Regular Carbon	0.230
Extra Carbon	0.270
Special Carbon	0.325
Oil Hardening	0.350
5% Cr Hot Work	0.350
Hi-Carbon-Cr	0.635

Grade by Analysis

W	Cr	V	Co	
18	4	1		1.505
18	4	2		1.65-1.66
20	25	4.25	1.6	12.25 3.535-3.675
19	4	2	7	2.460
18	25	4.25	1	4.75 2.125
18	4	2	9	2.445-2.45
13.5	4	3		1.6025
9	3.25	0.5		1.01

W	Cr	V	Mo	
6.4	4.5	1.9	5	0.96-0.965
6	4	3	6	1.190
1.5	4	1	8.5	0.810

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and W3.

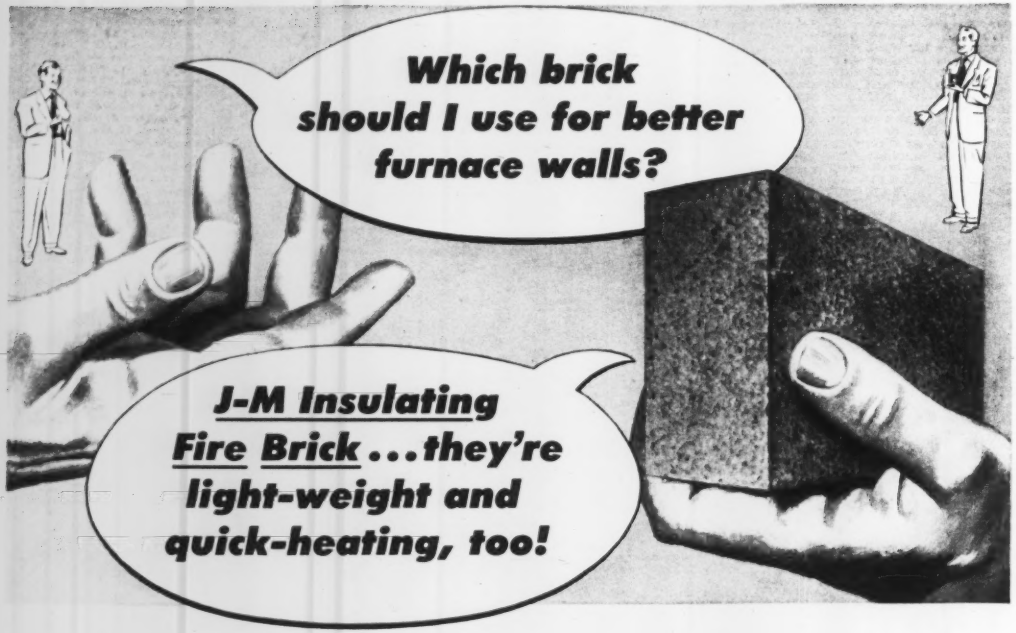
Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 New Eng-HighCarb.Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Div.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotor Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sioux-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S24 Seidelhuber Steel
T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
U4 Universal Cyclops Steel
U5 United States Steel Co.
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 Youngstown Sheet&Tube



6 types . . . for savings in services up to 3000F

Because of their quick-heating and low-heat transfer characteristics, Johns-Manville Insulating Fire Brick are efficient fuel-savers for use at operating temperatures up to a full 3000F on the insulation.

Each type of J-M Insulating Fire Brick has the correct balance of thermal and physical properties that assures maximum economies within a specific temperature range. All types are *quick-heating* . . . operating temperatures are reached in a short time, thereby saving fuel.

Identical materials can also be obtained in large size units known as Johns-Manville Insulating Fireblok. Fireblok have the same properties as the brick, but are made in extra large sizes for added construction economies. The large units can be installed faster . . . require fewer joints and less bonding mortar. During rebuilding or repair, furnace down-time is appreciably shortened with Fireblok construction.

A Johns-Manville insulation expert will gladly explain the advantages and economies of using J-M Insulating Fire Brick and Fireblok for refractory linings or as back-up insulation behind other refractory protection. Write to Johns-Manville, Box 60, New York 16, N. Y. In Canada, write 199 Bay St., Toronto 1, Ontario.

Properties	Types of Insulating Fire Brick and Fireblok					
	JM-3000	JM-28	JM-26	JM-23	JM-20	JM-1620
Temperature limit	†3000F	†2800F	†2600F	†2300F	†2000F	‡2000F †1600F
Density, lb per cu ft	63–67	58	48	42	35	29
Transverse strength, psi	120	120	125	120	80	60
Cold crushing strength, psi	300	150	190	170	115	70
Linear shrinkage, percent	*0.8 at 3000F	4.0 at 2800F	1.0 at 2600F	0.3 at 2300F	0.0 at 2000F	0.0 at 2000F
Reversible thermal expansion, percent	0.5–0.6 at 2000F	0.5–0.6 at 2000F	0.5–0.6 at 2000F	0.5–0.6 at 2000F	0.5–0.6 at 2000F	0.5–0.6 at 2000F
Conductivity (Btu in. per sq ft per F per hr at following mean temperatures)						
500F	3.10	2.00	1.92	1.51	0.97	0.77
1000F	3.20	2.50	2.22	1.91	1.22	1.02
1500F	3.35	3.00	2.52	2.31	1.47	1.27
2000F	3.60	3.50	2.82	2.70	1.72	. . .

*24-hr Simulative Service Panel Test; all others 24 hr soaking period. †Back-up or exposed. ‡Back-up only.

JOHNS MANVILLE JM PRODUCTS

Johns-Manville *first in* **INSULATIONS**

BUTTWELD STANDARD PIPE, T & C

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼		1½		2		2½		3	
List Per Ft	8.5c		11.5c		17c		23c		27.5c		37c		58.5c		76.5c							
Pounds Per Ft	0.85		1.13		1.68		2.28		2.73		3.68		5.82		7.62							
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5																	37	20.5	37	20.5		
Alton, Ill., L1	29.5	10.5	32.5	14.5	35	18	35.5	18.5	36	19.5	36.5	20					40	21.75	40	21.75		
Benwood, W. Va. W10	32.5	13.25	35.5	17.25	38	20.75	38.5	20.5	39	21.5	39.5	22					40	21.75	40	21.75		
Etna, Pa. N2 (†)	32.5	13.25	35.5	17.25	38	20.75	38.5	20.5	39	21.5	39.5	22					40	21.75	40	21.75		
Fontana, Calif. K1 (†)	21	1.75	24	5.75	26.5	9.25	27	9	27.5	10	28	10.5					28.5	10.25	28.5	10.25		
Ind. Harbor, Ind. Y1 (†)	31.5	12.25	34.5	16.25	37	19.75	37.5	19.5	38	20.5	38.5	21					39	20.75	39	20.75		
Lorain, O. N3 (†)	32.5	13.25	35.5	17.25	38	20.75	38.5	20.5	39	21.5	39.5	22					40	21.75	40	21.75		
Pittsburgh J5	30.75		33.75		36.25		36.75		37.25		37.75						41.5		41.5			
Sharon, Pa. M6 (†)	32.5	12.25	35.5	16.25	38	19.25	38.5	19	39	19.5	39.5	20					40	19.75	40	19.75		
Sparrows Pt., Md. B2	30.5	11.25	33.5	15.25	36	18.75	36.5	18.5	37	19.5	37.5	20					38	19.75	38	19.75		
Youngstown R2 (†)	32.5	13.25	35.5	17.25	38	20.75	38.5	20.5	39	21.5	39.5	22					40	21.75	40	21.75		
Youngstown Y1 (†)	32.5	13.25	35.5	17.25	38	20.75	38.5	20.5	39	21.5	39.5	22					40	21.75	40	21.75		
Wheatland, Pa. W9	32.5	13.25	35.5	16.25	38	18.75	38.5	19	39	19.5	39.5	20					40	20.25	40	20.25		

SEAMLESS STANDARD PIPE, T & C

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5	24	6	27	8.25	27	8.25	29	10.25	29	10.25	33.75	15	33.75	15
Ambridge, Pa. N2	24	6	27	8.25	27	8.25	29	10.25	29	10.25	33.75	15	33.75	15
Lorain, O. N3	24	6	27	8.25	27	8.25	29	10.25	29	10.25	33.75	15	33.75	15
Youngstown Y1	24	6	27	8.25	27	8.25	29	10.25	29	10.25	33.75	15	33.75	15

ELECTRIC WELD STANDARD PIPE, T & C

Youngstown, R2	24	6	27	8.25	27	8.25	29	10.25	29	10.25	33.75	15	33.75	15

BUTTWELD STANDARD PIPE, T & C

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼		1½		2	
List Per Ft	5.5c		6c		6c		9.2c		10.89									
Pounds Per Ft	0.24		0.42		0.57													
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv								
Benwood, W. Va. W10	29.5	†0.25	23.25	†3.5	17.75	†7.75	33	14.25	33	14.25								
Butler, Pa. F6 (†)	30.5	1.25	25	†1.75	20	†5.5												
Etna, Pa. N2 (†)	30.5	1.25	25	†1.75	20	†5.5	33	14.25	33	14.25								
Sharon, Pa. M6 (†)	29.5	†0.25	23	†4.25	18	†8.25												
Sparrows Pt., Md. B2	28.5	†0.75	23	†3.75	18	†7.50												
Youngstown R2 (†)							33	14.25	33	14.25								
Wheatland, Pa. W9	28.5	†0.75	23	†3.75	18	†7.50												

BOILER TUBES

Net base c.l. prices, dollars per 100 ft., mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld— H.R.	Elec. Weld— C.D.
1	13	14.19	16.71-17.77	16.20	16.20
1¼	13	16.97	19.80-21.26	16.46	19.19
1½	13	18.22-18.77	22.08-22.82	18.19	21.41
1¾	13	20.35-21.35	24.92-25.49	20.69	24.35
2	13	22.51-23.93	27.94-28.58	23.19	27.28
2¼	13	25.69-26.66	31.38-32.18	25.84	30.42
2½	12	28.40-29.36	34.55-35.58	28.46	33.50
2¾	12	31.28-32.17	37.83-39.19	31.19	36.67
2¾	12	33.57-34.82	40.69-42.44	33.05	38.86
3	12	35.78-36.87	42.11-44.93	34.98	40.82

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

	Reg. Hvy.
6 in. and shorter:	
½-in. & smaller diam.	15
⅝-in. & ⅝-in.	18.5
¾-in. and larger	17.5
Longer than 6 in.:	
All diams	14
Lag bolts, all diams.:	
6 in. and shorter	23
over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap and Sleigh Shoe	21
Tire bolts	21
Boiler & Fitting-Up Bolts	31

NUTS

H.P. & C.P. Square:	Reg.	Hvy.
½-in. & smaller	15	*
⅝-in. & ⅝-in.	12	6.5
¾-in.-1½-in.	9	1
1⅝-in. & larger	7.5	-1
C.P. Hex		
½-in. & smaller	26	22
⅝-in. & ⅝-in.	16.5	6.5
¾-in.-1½-in.	12	2
1⅝-in. & larger	8.5	2
H.P. Hex		
½-in. & smaller	26	22
⅝-in. & ⅝-in.	23	17.5
¾-in. & 1½-in.	19.5	12
1⅝-in. & larger	12	6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Reg.	Hvy.
½-in. & smaller	35	28.5
⅝-in. & ⅝-in.	29.5	22
¾-in.-1½-in.	24	15
1⅝-in. & larger	13	8.5
	Light	
½-in. & smaller	35	
⅝-in. to ⅝-in.	28.5	
¾-in. to 1½-in.	26	

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish	48 & 10
Plated finishes	31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
⅝-in. & smaller	42
¾-in. through 1 in.	34
Longer than 6 in.:	
⅝-in. & smaller	26
¾-in. through 1 in.	4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam x 6 in. and shorter	38
1 in. and smaller diam. x over 6 in.	26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	25
¼-in. diam. & larger	16
N.F. thread, all diams.	10

RIVETS

F.o.b. midwestern plants

Structural ½-in. larger	7.85c
⅞-in. under	36 off

ELECTRODES

(Threaded, with nipples, unboxed f.o.b. plant)

GRAPHITE

Inches — Diam.	Length	Cents per lb
17.18-20	60-72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.93

CARBON

35.40	110	8.03
30	65,84,110	8.03
24	72 to 104	8.03
17 to 20	34,90	8.03

METALLURGICAL COKE

Price net ton

BEEHIVE OVENS

Connellsvill fur.	$14.50-15.00
Connellsvill fdy	16.50-17.50
New River foundry	20.80
Wise county, foundry	15.95
Wise county, furnace	15.20

OVEN FOUNDRY COKE

Kearney, N. J., ovens	$22.75
Everett, Mass., ovens	
New England, del.	*24.80
Chicago ovens	23.00
Chicago, del.	24.50
Terre Haute, ovens	22.50
Milwaukee, ovens	23.75
Indianapolis, ovens	22.75
Chicago, del.	26.62
Cincinnati, del.	25.85
Detroit, del.	27.05
Ironton, O., ovens	22.50
Cincinnati, del.	25.12
Painesville, O., ovens	24.00
Cleveland, del.	25.82
Erie, Pa., ovens	23.50
Birmingham, ovens	20.30
Cincinnati, del.	25.23
LoneStar,Tex., ovens	18.00
Philadelphia, ovens	22.70
Neville Island,Pa., ovens	23.00
Swedeland, Pa., ovens	22.80
St. Louis, ovens	
St. Louis, del.	25.40
Portsmouth, O., ovens	22.50
Cincinnati, del.	25.12
Detroit, ovens	24.00
Detroit, del.	25.00
Buffalo, del.	26.58
Flint, del.	26.72
Pontiac, del.	25.58
Saginaw, del.	27.08

*Or within $4.56 freight zone from works.

COAL, CHEMICALS

Spot, cents per gallon; ovens	
Pure benzol	30.00-35.00
Toluol, one deg.	26.00-33.00
Industrial xylol	25.00-33.50
Per ton bulk ovens	
Sulphate of ammonia	$32-$45
Cents per pound, ovens	
Phenol, 40 (carlots, non-returnable drums)	17.25

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF2 content 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers—List to list-plus-$1

STAINLESS STEEL

(Add 4.7% on base price and extras)

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	41.00	34.00	31.25
302	41.25	36.75	31.50
303	43.25	40.25	34.00
304	43.25	38.75	33.00
309	56.00	55.00	44.75
316	57.00	59.00	49.25
321	49.25	48.25	37.00
347	53.75	52.25	41.50
410	36.50	30.50	25.75
416	37.00	37.00	26.25
420	44.00	47.00	31.25
430	39.00	31.00	*26.25
501	27.50	26.00	14.25
502	28.50	27.00	15.25

Bait., Types 301-347 and 430 sheets, except 303 and 309 E2.

Brackenridge, Pa., sheets A4 quotes slight variations on Types 301-347.

Bridgeville, Pa., bars, wire, sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502 S18.

Cleveland, strip A7.

Detroit, strip M1 quotes 34.00c on Type 301; 36.50c, 302; 38.50c, 304; 58.50c, 316; 52.00c, 347; 30.50c, 410; 31.00c 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip and wire C18.

Massillon, O., all items, R2.

McKeesport, Pa., strip, Type 410; bars & wire, Types 410 through 430 and 31.25c on Type 302, 33.75c on 303, 32.75c on 304, 48.75c on 316, 36.75c on 321, 41.25c on 347 F2.

McKeesport, Pa., bars, sheets except Type 416 U5.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars U5.

Muncie, Ind., wire I-7 quotes types 302, 304, 430.

Pittsburgh, sheets C18.

Reading, Pa., strip except 34.25c on Type 301 and 56.00c on 309; bars except 31.50c on Type 301 and 45.25c on 309 C4.

Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Tittusville, Pa., bars U4.

Wallingford, Conn., strip W2 quotes 0.25c higher.

Washington, Pa., bars, sheets & strip except 0.25c higher on Type 301 J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303, 309, 316 sheets 62.00c, strip 64.00c W4.

Watervliet, N. Y., structurals & bars A4 quotes variations on Types 301-347.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.

Youngstown, strip except Types 303, 309, 316, 416, 501 and 502 and 34.25c on Type 301 C8.

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh except as otherwise noted)

	Cents
Sponge iron:	
98+% Fe, annealed	18.00
Unannealed	14.50
Swedish, c.l.f. New York, in bags	8.85-9.95
Electrolytic iron:	
Annealed, 99.5% Fe	42.50
Unannealed (99 + % Fe)	36.50
Unannealed, 99 + % Fe (minus 325 mesh)	53.50
Powder Flakes	48.50
Carbonyl Iron:	
97.9-99.8% size 5 to 10 microns	$3.00-$48.00
Aluminum:	
Carlots, freight allowed	31.00
Atomized, 500 lb drums, freight allowed	33.00
Antimony, 500 lb lots	71.00
Brass, 20-ton lots	28.25-32.00
Bronze, 10-ton lots	51.25-60.00
Phosphor-Copper, 20-ton lots	50.00
Copper:	
Electrolytic	37.25
Reduced	34.75
Lead	22.50
Magnesium	75.00-85.00
Manganese:	
Minus 100 mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	86.00
Nickel-Silver 5-ton lots	44.50
Silicon	38.50
Solder (plus cost of metal)	8.50
Stainless Steel, 302	83.00
Zinc, 10-ton lots	20.00-28.00
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	5.85
Less than 1000 lb	6.00
Molybdenum:	
99.9% minus 200 mesh	3.24
Chromium, electrolytic 99% Cr min.	3.50

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SPECIALTY TOOL • ALLOY • AND • STAINLESS STEELS

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, for delivery within switching limits, subject to extras.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Bds.	H.R. Alloy 4140††		Carbon	Floor
New York (city)	6.56	7.57	8.77	6.86		6.89	7.83	11.34	6.69	6.90	8.31
Jersey City (c'try)	6.35	7.27	8.47	6.75		6.59	7.53	9.54	6.39	6.60	8.01
Boston (city)	6.71	7.56	8.74	6.75		6.62	7.53‡	10.50§	6.76	6.95	8.18
Boston (c'try)	6.51	7.36	8.54	6.55		6.42	7.63‡	10.60§	6.56	6.75	7.98
Phila. (city)	6.36	7.38	8.60	6.70	8.55	6.67	7.70	11.04	6.42	6.49	7.62
Phila. (c'try)	6.11	7.13	8.35	6.45	8.30	6.42	7.45	10.79	6.17	6.24	7.36
Balt. (city)	6.01	7.37	8.62	6.62		6.61	7.62	11.37	6.67	6.67	7.90
Balt. (c'try)	5.81	7.17	8.42	6.42		6.41	7.42	11.17	6.47	6.47	7.70
Norfolk, Va.	7.60					6.44	8.45		7.25	6.64	7.33
Richmond, Va.	6.14	6.95	8.68	6.53		6.30	7.38		6.58	6.68	7.80
Wash. (w'hse)	6.24	7.61	8.90	6.89		6.90	7.78		6.93	6.95	8.17
Buffalo (del.)	6.00	6.85	8.66	6.41		6.10	7.15	11.27	6.28	6.50	7.87
Buffalo (w'hse)	5.80	6.65	8.46	6.21		5.90	6.95	11.07	6.08	6.30	7.67
Pitts. (w'hse)	5.80	6.65	8.05	5.94		5.83	6.90	10.65	5.95	5.95	7.18
Detroit (w'hse)	6.07	6.92	8.34	6.13	7.70-8.03	6.30	7.10	10.92	6.42	6.47	7.52
Cleveland (del.)	6.00	6.85	8.39	6.20		6.09	7.11	10.99	6.48	6.32	7.71
Cleve. (w'hse)	5.80	6.65	8.19	6.00		5.89	6.91	10.79	6.28	6.12	7.51
Cincin. (city)	6.28	6.87	8.67	6.36		6.28	7.31	11.22	6.57	6.62	7.75
Chicago (city)	6.00	6.85	8.25	6.03		6.03	7.00	10.85	6.15	6.15	7.38
Chicago (w'hse)	5.80	6.65	8.05	5.83		5.83	6.80	10.65	5.95	5.95	7.18
Milwau. (city)	6.17	7.02	8.22	6.20		6.20	7.27	11.02	6.32	6.32	7.55
Milwau. (c'try)	5.97	6.82	7.02	6.00		6.00	7.07	11.82	6.12	6.12	7.35
St. Louis (del.)	6.30	7.15	8.55	6.34		6.33	7.40	11.15	6.55	6.55	7.78
St. L. (w'hse)	6.10	6.95	8.35	6.14		6.13	7.20	10.95	6.35	6.35	7.58
Birm'hm (city)‖	5.95	6.80	7.85#	5.95		5.95	8.40		6.10	6.25	8.85
Birm'hm (w'hse)	5.80	6.65	7.70#	5.80		5.80	8.40		5.95	6.10	8.65
Los Ang. (city)	6.80	8.65	10.00	6.94	11.40	6.80	8.81	12.25	6.80	6.86	9.67
L. A. (w'hse)	6.60	8.45	9.80	6.74	11.20	6.60	8.61	12.05	6.60	6.66	9.47
Seattle-Tacoma	7.46	8.46	9.60	7.39		7.22	9.62	10.90¶	6.91	7.19	9.07
SanFran. (w'hse)	6.80	8.22	9.70	6.79		6.70	8.65	11.85	6.70	6.85	9.20

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ add 25-cent special bar quality extra; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted. Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; ‖—500 to 1499 lb; #—450 to 1499 lb.; ¶—1000 to 1999 lb.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports.

Old range bessemer	$9.45
Old range nonbessemer	9.30
Mesabi bessemer	9.20
Mesabi nonbessemer	9.05
High phosphorus	9.05

After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 1, 1950, in applicable lake vessel rates, upper lake rail, freights, dock handling charges and taxes thereon.

Eastern Local Ore

Cents per unit del., E. Pa.

Foundry and basic 56-62% concentrates contract 17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:

Spot	nom.
Long-term contract	24.00
North African hematites (spot)	26.00-28.00
Brazilian iron ore, 68-69% (spot)	32.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite, mines	65.00

Manganese Ore

Manganese, 48% nearby, $1.18-1.22 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 85c-87c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$39.00-42.00
48% 3:1	44.00-45.00
48% no ratio	30.00-32.00

South African Transvaal

44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00

Brazilian

44% 25:1 lump	nom.

Rhodesian

45% no ratio	$29.00
48% no ratio	31.50-32.00
48% 3:1 lump	50.00-51.00
Domestic—rail nearest seller 48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb. molybdenum content, mines	$1.08

REFRACTORIES

(Ceiling prices, effective Sept. 23, 1952, per 1000 units)

Fire Clay Brick

High-Heat Duty: Pueblo, Colo., $89.00; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lochhaven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $99.30; Salina, Pa., $104.55; Niles, O., $109; Los Angeles, Pittsburg, Calif., $132.30.

Silica Brick

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $99.30; Hays, Pa., $105.10; Niles, O., $107; E. Chicago, Ind., Joliet, Rockdale, Ill., $109.70; Cutler, Utah, $116.55; Los Angeles, $122.85.

Insulating Fire Brick

2300° F: Massillon, O., $178.50; Clearfield, Pa., $179.55; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $186.90.

Ladle Brick

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Wellsville, O., $69.30; Mexico, Mo., $73.50; Clearfield, Pa., Portsmouth, O., $83; Perla, Ark., $92.40; Los Angeles, $110.25; Pittsburg, Calif., $111.30.

Sleeves

Reesdale, Pa., $127; Johnstown, Pa., $127.30; Clearfield, Pa., $135; St. Louis, $138; Athens, Tex., $140.90.

Nozzles

Reesdale, Pa., $203.20; Johnstown, Pa., $208.40; Clearfield, Pa., $219.45; St. Louis, $224.65; Athens, Tex., $225.20.

Runners

Reesdale, Pa., $158.20; Johnstown, Pa., $161.70; Clearfield, Pa., $168.60; St. Louis, $170.30; Athens, Tex., $174.40.

High-Alumina Brick

50 *Per Cent*: Clearfield, Pa., St. Louis, Mexico, Mo., $166.30; Danville, Ill., $169.30.

60 *Per Cent*: St. Louis, Mexico, Vandalia, Mo., $210.20; Danville, Ill., $213.20.

70 *Per Cent*: St. Louis, Mexico, Vandalia, Mo., $244.85; Danville, Ill., $247.85; Clearfield, Pa., $252.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 10.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot add 0.25c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max.). Contract, c.l. lump, bulk 7.0c per lb of alloy, c.l. packed 7.75c, ton lot 8.5c, less ton 9.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3⅝ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 14.50c per lb of briquet, carload packed 15.2c, ton 16.0c, less ton 16.9c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.45c per lb of briquet, c.l. packaged 13.25c, ton lot 14.05c, less ton 14.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3⅛ lb and containing exactly 2 lb of Mn and approx. ⅛ lb of Si). Contract, c.l. bulk 12.65c, per lb of briquet, c.l. packed 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size — weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.95c per lb of briquet, c.l. packed 7.75c, ton lot 8.55c, less ton 9.45c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 7.1c, c.l. packed 7.9c, ton lot 8.7c, less ton 9.6c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

NOTE: Current prices on chromium, silicon, vanadium, boron and tungsten alloys appeared on page 223, Sept. 22 issue; manganese and titanium alloys and "other" ferroalloys, page 181, Sept. 15.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Feb. 5, 1952.

STEELMAKING SCRAP COMPOSITE

Oct. 9	$43.00
Oct. 2	43.00
Sept., 1952	43.00
Oct., 1951	43.60
Oct. 1947	39.85

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin, and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

Grade 1 Basing Point	No. 1 Bundles Dealer, Industrial	No. 1 Heavy Melt Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Pt., Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades	
2 No. 1 Bushelling	Base
3 No. 1 Heavy Melting	$1.00
4 No. 2 Heavy Melting	1.00
5 No. 2 Bundles	1.00
6 Machine Shop Turnings	10.00
7 Mixed Borings and Short Turnings	6.00
8 Shoveling Turnings	6.00
9 No. 2 Bushelling	4.00
10 Cast Iron Borings	6.00
Elec. Furnace and Fdry. Grades	
11 Billet, Bloom & Forge Crops	+ 7.50
12 Bar Crops & Plate	+ 5.00
13 Cast Steel	+ 5.00
14 Punchings & Plate Scrap	+ 2.50
15 Electric Furnace Bundles	+ 2.00
Cut Structurals & Plate	
16 3 feet and under	+ 3.00
17 2 feet and under	+ 5.00
18 1 foot and under	+ 6.00
19 Briquetted Cast Iron Borings	Base
Foundry Steel	
20 2 feet and under	Base
21 1 foot and under	+ 2.00
22 Springs and Crankshafts	+ 1.00
23 Alloy Free Turnings	— 3.00
24 Heavy Turnings	— 1.00
25 Briquetted Turnings	Base
26 No. 1 Chemical Borings	— 3.00
27 No. 2 Chemical Borings	— 4.00
28 Wrought Iron	+ 10.00
29 Shafting	+ 10.00
31 Old Tin & Terne Plated Bundles	10.00

Unprepared Grades

When compressed constitutes:

32 No. 1 Bundles	6.00
33 No. 2 Bundles	9.00
34 Other than material suitable for hydraulic compression	8.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for grades 12 and 8, respectively.

(2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes and in the case of Grade 27 for briquetting and direct charging into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10.

(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.

(4) Premiums for Grades 11-18, 20 and 21 may be charged only when sold for use in electric and acid open-hearth furnaces or foundries, or in basic O-H or blast furnace under NPA allocation or OPS authorization.

(5) Prices for Grade 29 may be charged only when sold for forging or refolling purposes.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap:

2 No. 2 Heavy Melting Steel	$2.00
3 No. 2 Steel Wheel	Base
4 Hollow Bored Axles and loco. axles with keyways between the wheelseats	Base
5 No. 1 Bushelling	— 3.50
6 No. 1 Turnings	— 3.00
7 No. 2 Turnings, Drillings & Borings	— 12.00
8 No. 2 Cast Steel and uncut wheelcenters	— 6.00
9 Uncut Frogs, Switches	Base
10 Slues, Tubes & Pipes	— 8.00
11 Structural, Wrought Iron and/or steel, uncut	— 6.00
12 Destroyed Steel Cars	— 8.00
13 No. 1 Steel Scrap	— 9.50
14 Scrap Rails, Random Lengths	+ 2.00
15 Retolling Rails	+ 7.00
Cut Rails	
16 3 feet and under	+ 5.00
17 2 feet and under	+ 6.00
18 18 inches and under	+ 8.00
19 Cast Steel, No. 1	+ 3.00
20 Uncut Tires	+ 2.00
21 Cut Tires	+ 5.00
Benders & Side Frames	
22 Uncut	Base
23 Cut	+ 3.00
24 Angles, Splice Bars & Tie Plates	+ 5.00
25 Solid Steel Axles	+ 12.00
26 Steel Wheels, No. 2, oversize	Base
27 Steel Wheels, No. 3	+ 5.00
28 Spring Steel	+ 5.00
29 Couplers & Knuckles	+ 5.00
30 Wrought Iron	+ 8.00
31 Firebexes	8.00
32 Boilers	6.00
33 No. 2 Sheet Scrap	13.00
34 Cabooses, Doors, Car Ends, cut apart	— 6.00
35 Unassorted Iron & Steel	— 6.00
36 Unprepared scrap not suitable for hydraulic compression	— 8.00

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin, authorized by OPS are:

(1) For preparing into Grades No. 3, No. 4 or No. 2, $8.

(2) For hydraulically compressing Grade No. 1, $6 per ton; Grade No. 5, $8.

(3) For crushing Grade No. 6, $3. For preparing into:

(4) Grade No. 20, $6.

(5) Grade No. 19, $6.

(6) Grades No. 12, No. 13, No. 14, No. 16 or No. 20, $10.

(7) Grade No. 17 or No. 21, $11.

(8) Grade No. 18, $12.

(9) For hydraulically compressing Grade No. 15, $8.

(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:

(1) For preparing into Grade No. 1 and Grade No. 2, $8.

(2) For hydraulically compressing Grade No. 13, $6. For preparing into:

(3) Grade No. 16, $4.

(4) Grade No. 17, $5.

(5) Grade No. 18, $7.

(6) Grade No. 21, $4.

(7) Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:

(1) For preparing Grade No. 8 into Grade No. 7, $9.

(2) For preparing Grade No. 3 into Grade No. 11, $7.

(3) For preparing Grade No. 3 into Grade No. 1, $4.

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:

1. No. 1 (Cupola)	$49.00
2. No. 2 (Charging Box)	47.00
3. No. 3 (Hvy. Breakable)	45.00
4. No. 4 (Burnt Cast)	41.00
5. Cast Iron Brake Shoes	41.00
6. Stove Plate	46.00
7. Clean Auto Cast	52.00
8. Unstripped Motor Blocks	43.00
9. Wheels, No. 1	47.00
10. Malleable	55.00
11. Drop broken machinery	52.00

OPEN MARKET

(Delivered prices include broker's commission.)

Birmingham
(Delivered)

Shoveling turnings	$30.00-32.00
Cast iron borings	30.00-32.00
No. 1 cupola cast	47.00-48.00
Stove plate	42.00
Charging box cast	39.00-40.00
Heavy breakable	36.00-37.00
Drop broken machinery	42.00-43.00
Unstripped motor blocks	35.00-36.00

Boston
(F.o.b. shipping point)

No. 1 cupola cast	41.00
Heavy breakable	36.00
Stove plate	34.00-35.00
Unstripped motor blocks	30.00

Buffalo
(Delivered)

No. 1 heavy melting	43.00
No. 2 heavy melting	43.00
No. 1 bundles	44.00
No. 1 bushelling	44.00
No. 2 bundles	43.00
Machine shop turnings	34.00
Mixed borings, turnings	38.00
Cast iron borings	38.00
Short shoveling turnings	38.00
No. 1 cupola cast	47.00-49.00
No. 1 machinery cast	49.00-50.00

Chicago
(Delivered)

No. 2 heavy melting	42.50
No. 2 bundles	42.50
Machine shop turnings	33.50
Mixed borings, turnings	35.00-37.50
Shoveling turnings	37.50
Cast iron borings	35.00-37.50
No. 1 cupola cast	47.00-49.00
Charging box cast	43.00-45.00
Heavy breakable	41.00-43.00
Burnt cast	37.00-39.00
Cast iron brake shoes	39.00-41.00
Stove plate	44.00-46.00
Clean auto cast	50.00-52.00
Unstripped motor blocks	37.00-39.00
Malleable	50.00-52.00
Drop broken machinery	50.00-52.00

Cleveland
(Delivered)

No. 1 heavy melting	43.00
No. 2 heavy melting	43.00
No. 1 bundles	44.00
No. 2 bundles	43.00
Machine shop turnings	34.00
Mixed borings, turnings	38.00
Shoveling turnings	38.00
Cast iron borings	38.00
(F.o.b. shipping point)	
No. 1 cupola	49.00
Charging box cast	47.00
Burnt cast	41.00
Stove plate	46.00
Clean auto cast	52.00
Unstripped motor blocks	43.00
Malleable	55.00
Drop broken machinery	52.00

Detroit
(F.o.b. shipping point)

No. 1 cupola cast	49.00†
Heavy breakable	45.00†
Clean auto cast	52.00†
Unstripped motor blocks	43.00†
Drop broken machinery	52.00†
Charging box cast	47.00†

(Nominal.

Los Angeles
(Delivered)

No. 2 bundles	29.00
No. 1 cupola cast	49.00

New York
(Brokers' buying prices)

No. 2 heavy melting	35.99
Mixed boring, turnings	29.99
Machine shop turnings	25.99
Cupola cast	42.00-43.00
Unstripped motor blocks	36.00-37.00

Philadelphia

No. 1 heavy melting	41.50†
No. 2 heavy melting	41.50†
No. 1 bundles	42.50†
No. 2 bundles	41.50†
No. 1 bushelling	42.50†
Mixed borings, turnings	36.50†
Machine shop turnings	32.50†
Short shoveling turnings	36.50†
No. 1 cupola cast	48.00-50.00††
Unstripped motor blocks	42.00††
Heavy breakable	45.00††
Machinery cast	52.00††
Charging box cast	47.00††

†Ceiling price. ‡Nominal. $Shipping point. ††Delivered.

Pittsburgh
(Delivered)

No. 2 heavy melting	44.00†
No. 1 bundles	45.00†
No. 2 bundles	44.00†
Machine shop turnings	35.00†
Shovel turnings	39.00†
No. 1 cupola cast	48.50
Heavy breakable	45.00

†Ceiling price.

San Francisco
(Delivered)

No. 2 heavy melting	31.00
Machine shop turnings	17.00
No. 2 bundles	29.00
No. 1 cupola cast	43.00

Seattle
(F.o.b. shipping point)

No. 1 cupola cast	44.00
Heavy breakable	40.00
Unstripped motor blocks	33.00

St. Louis
(Delivered)

No. 1 cupola	48.00
Unstripped motor block	38.00

Youngstown
(Delivered)

No. 2 heavy melting	43.00
No. 2 bundles	43.00
Machine shop turnings	34.00

HAMILTON, ONT.
(Delivered Prices)

Heavy Melt	$35.50
No. 1 Bundles	35.50
No. 2 Bundles	35.50
Mechanical Bundles	32.00
Mixed Steel Scrap	31.50
Mixed Borings, Turnings	32.50
Rails, Remelting	35.50
Rails, Rerolling	44.50
Bushelling	30.00
Bushelling new factory:	
Prep'd	33.50
Unprep'd	31.50
Short Steel Turnings	32.50
Cast Iron Grades†	
No. 1 Machinery Cast	50.00

†F.o.b., shipping point.

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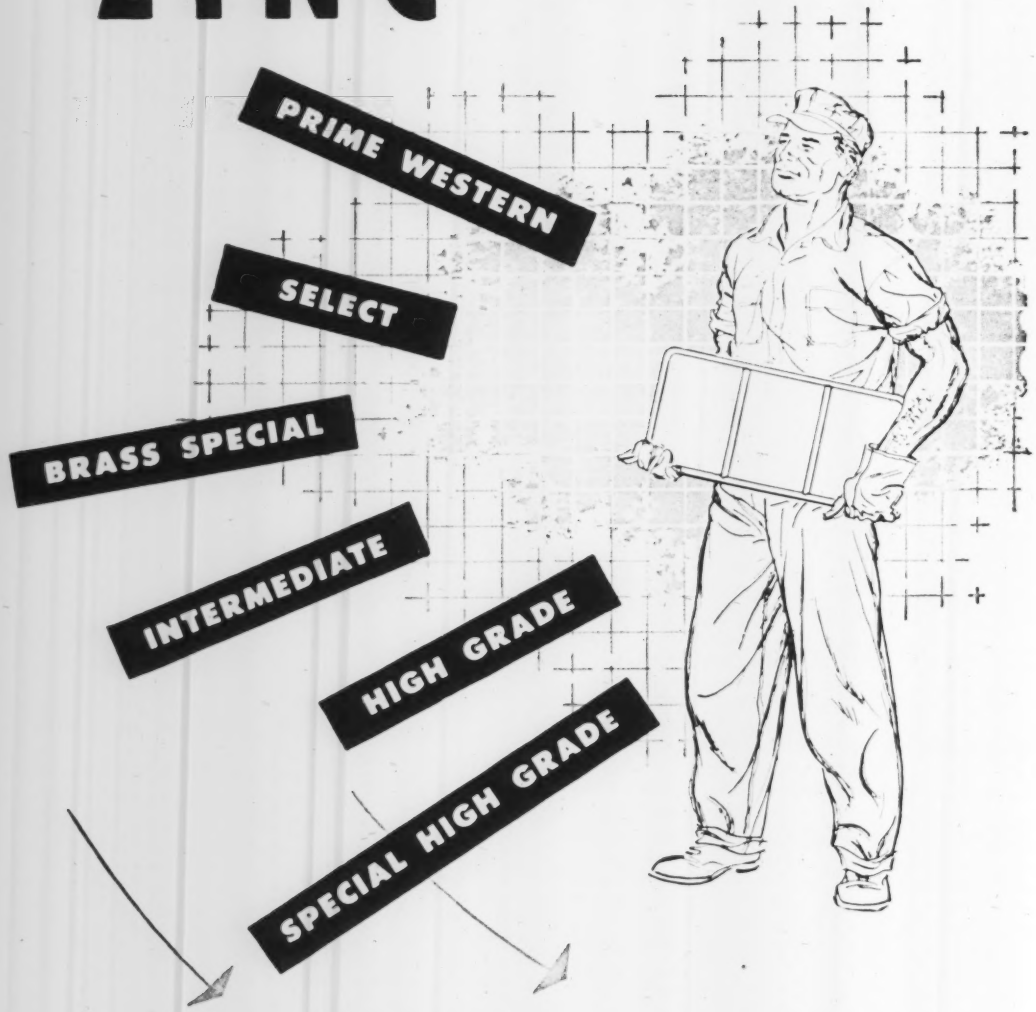

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The Metal Market

Aluminum Plant Blossoms in the Deep South

A rapidly growing industrial plant is Kaiser Aluminum & Chemical Corp.'s primary aluminum reduction center at Chalmette, La. This view shows a portion of a large steam power plant, foreground, and new potlines under construction in the background. The Chalmette plant expects to take a vital part in the nation's aluminum production with 400-million-pounds annual output upon completion in 1953

Supply situation in the metals market is one of contrasts. Deficits exist in primary aluminum and copper, while there are surpluses of zinc and lead. Nickel is hopelessly tight

FEAST OR FAMINE still characterizes the metal market.

Of major basic metals, deficits still exist in primary aluminum and copper, while surpluses show in zinc and lead. Other metals range between these extremes, with the exception of nickel which is hopelessly tight.

Where's the Aluminum?—In aluminum, for example, most producers have full order books in the fourth quarter on strip, rods and bars, pipe and tubing, extrusions, forging stock and screw machine stock. Sheets and plate are booked well into first quarter. Foil and electrical conductor can be ordered for fourth-quarter delivery though.

Free availability of screw machine stock is predicted for the first quarter as a result of NPA's putting more metal into this program.

No Sale—Civilian goods producers, allowed about half their pre-Korea use of aluminum, will be distraught in finding they'll get only about half their meager entitlements in fourth quarter. There just won't be enough metal to go around and these people won't be able to find homes for CMP tickets. Mill product prices may go up another 3 per cent, too, if mills can convince OPS that the 5 per cent pass-through on pig or ingot price increase wasn't enough.

First quarter may bring another crisis in mill products if primary production is slashed further by tricks of nature. Mills are now eating into ingot backlogs they've so carefully nursed and may find nothing left over to roll early next year. Government progress on further basic aluminum expansion remains at its slow crawl, and the stockpile will get no aluminum additions this year, unless it's high-steel-content metal.

Brass Busier—Upsurge in orders over the last few weeks heartens brass mills considerably. Order books are filling out well, a condition not common for some time.

More brass is going to screw machine people particularly. Their shops are busier as defense orders mount. Demand for sheet and strip copper and brass, according to one producer, is limited only to the extent that the metal is limited. Stampers seem to be particularly active in seeking sheet and strip.

Action Abroad—Lead and zinc markets were adversely affected by resumption of lead trading on the London exchange for the first time in 13 years. Lead prices broke sharply, and U. S. offerings of foreign lead spurted, causing domestic sellers to nip prices another penny a pound. Price is now quoted at 14.80, St. Louis, for October delivery. Lead sheets and pipe also dropped one cent to 20.00 cents per pound; lead oxides are off another cent too.

Zinc reacted swiftly to the lead tumble. The already-nervous dual prices quoted for about two weeks at 13.50 to 14.00 cents a pound, East St. Louis, for Prime Western, settled at the lower level. Minor tonnages were sold at 13 cents, but with the uneasy price, no one wants to stick his neck out by placing orders. High grade zinc is quoted at 14.85, brass special at 13.75, intermediate at 14.00 and die casting alloy at 18.00, East St. Louis.

Nonferrous Briefs

Bolivian tin mines are now under control of the government, as the nationalization plan went into effect and bank funds of major companies were tied up.

Imports of Chilean copper in the last five months have been double the 1951 monthly average.

Brass scrap, slow-moving in recent months, is now selling in much better volume.

Copper demand stays strong in the U. S. but is weakening decidedly in Europe.

NPA is being less stringent in passing out supplementary allocations of copper these days, and stocks in fabricators' hands are healthier.

Third-quarter purchase and resale contracts negotiated by the government will increase copper supply by 77,100 tons, manganese concentrates by 456,000 long ton units, titanium sponge by 2700 tons, molybdenum concentrates by 4400 tons of contained metal and zinc by 3000 tons.

Aluminum output in the fourth quarter is estimated at an annual rate of 1,095,000 tons, 63 per cent of the government goal.

Slab zinc shipments in September topped output by 2000 tons, reducing producers' stocks proportionally. Delivered to the U. S. government were 5132 tons, compared with 1381 in August.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5, 1-in. 115c; 27.25c; 88-10-2, 1-in. 215c; 40.00c; 80-10-10, 1-in. 305c; 33.00c. No. 1 yellow (92-8) 405c; 23.25c.

Zinc: Prime western, 13.50-14.00c; brass special, 13.75-14.25c; intermediate 14.00-14.50c; E.s.t.r. (over 99.99) grade 14.50-15.00c, delivered.

Lead: Common, 14.00c, delivered; 14.50c, New York; 14.35c, St. Louis.

Primary Aluminum: 99% plus, ingots 20.00c; pigs 19.00c. Base prices for 10,000 lb and over. Freight allowed on 5,000 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys, 20.50c; No. 12 foundry alloy, No. 2 grade, 19.50c; steel-deoxidizing grades (cast bars guaranteed of stated grade): 1, 18.50c; grade 2, 18.00c; grade 3, 18.40c; grade 4, 18.20c.

Magnesium: Commercially pure (99.8%), standard ingots, 10,000 lb and over, 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 121.50c.

Antimony: American, 99.00% and over but not meeting specifications below, 20.00c; 99.5%, and over (arsenic 0.05% max., other impurities 0.1% max.), 20.50c, f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery unpacked, 56.50c; 25-lb pigs, 57.15c; NX nickel shot, 60.15c; F nickel shot or ingots, for addition to cast iron, 56.50c. Prices include import duty.

Mercury: Open market spot, New York, $190-$193 per 76-lb flask.

Beryllium Copper: 3.75-4.25%, Be, $1.56 per lb of alloy, f.o.b. Reading, Pa.

Cadmium: Regular, straight or flat forms, $2.00 del; special or patented shapes $2.15.

Cobalt: 97.99%, $2.40 per lb for 500 lb (keg); $2.42 per lb for 100 lb (case); $2.47 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 83.25c per oz.

Platinum: $90-$91 per ounce from refineries.

Palladium: $23-$24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Ceiling prices, cents per pound, f.o.b. mill, effective July 1, 1952)

Sheet: Copper 43.52; yellow brass 40.17; commercial bronze, 95% 45.15, 90% 44.38; red brass, 80% 44.10, 80% 42.34; best quality 41.35; nickel silver, 18% 53.08; phosphor bronze grade A, 5% 64.71.

Rod: Copper, hot-rolled 41.37, cold-drawn 42.62; yellow brass free cutting 33.86; commercial bronze, 95% 44.84, 90% 44.07; red brass, 85% 42.79, 80% 42.01.

Seamless Tubing: Copper 43.66; yellow brass 43.18; commercial bronze, 90% 47.04; red brass, 80% 46.01.

Wire: Yellow brass 40.16; commercial bronze, 95% 45.44, 90% 44.67; red brass, 85% 43.39, 80% 42.63; best quality brass 41.64.

(Base prices, effective July 1, 1952)

Copper Wire: Bare, soft, f.o.b. eastern mills, 100,000 lb, lots 32.70c, 30,000 lb lots 32.92c, l.c.l. 33.42. Weatherproof, 100,000 lb, 33.60c, 30,000 lb, 33.85c, l.c.l. 34.35. Magnet wire, del., 15,000 lb or more, 38.75, l.c.l., 39.50.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 10,000 lb c.l. orders. Effective Aug. 4, 1952.)

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range Inches	Widths or Diameters, Sheet In.	Inc	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circlet Base
0.249-0.136	12-48		31.6	....	....
0.135-0.096	12-48		32.1	....	....
0.095-0.077	12-48		32.8	30.6	34.9
0.076-0.061	12-48		33.4	30.8	35.1
0.060-0.048	12-48		33.7	31.0	35.4
0.047-0.038	12-48		34.1	31.3	35.7
0.037-0.030	12-48		34.5	31.7	36.3
0.029-0.024	12-48		35.1	32.0	36.8
0.023-0.019	12-36		35.7	32.7	37.5
0.018-0.017	12-36		36.4	33.3	38.4
0.016-0.015	12-36		37.3	34.0	39.6
0.014	12-24		38.3	35.0	40.8
0.013-0.012	12-24		39.3	35.7	41.7
0.011	12-24		40.3	36.8	43.3
0.010-0.0095	12-24		41.4	37.9	44.8
0.009-0.0085	12-24		42.6	39.1	46.6
0.008-0.0075	12-24		44.0	40.3	48.4
0.007	12-18		45.5	41.7	50.6
0.006	12-18		47.0	43.1	53.4

* Lengths 72 to 180 inches. † Maximum diameter 26 inches.

Screw Machine Stock: 5000 lb and over

Dia. (in.) or distance across flats	Round R317-T4	Hexagonal R-317-T4	17S-T4
0.125	54.6	....	....
0.156-0.0188	46.2	....	....
0.219-0.313	43.6	....	....
0.375	42.0	48.3	50.4
0.406	42.0	....	....
0.438	42.0	48.3	50.4
0.469	42.0	....	....
0.500	42.0	48.3	50.4
0.531	42.0	....	....
0.563	42.0	....	47.3
0.594	42.0	....	....
0.625	42.0	45.7	47.3
0.688	42.0	....	47.3
0.750-1.000	41.0	43.1	44.6
1.063	41.0	....	43.1
1.125-1.500	39.4	41.5	43.1
1.563	38.9	....	....
1.625	38.3	....	41.5
1.688-2.000	38.3	....	....

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets: Full rolls, 140 sq ft or more $20.00 per cwt; and 50c cwt 100 sq ft to 140 sq ft. Pipe: Full coils, $20.00 per cwt. Traps and bends, list prices plus 45%.

ZINC

Sheets 23.00c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 21.25c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 22.50c; over 12-in., 22.50-23.00c.

"A" NICKEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 43.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb 10,000 lb and over, f.o.b. mill) Sheets, $15; sheeted mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

DAILY PRICE RECORD

1952	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Oct. 7-9	24.50	14.00	13.50-14.00	121.50	20.00	39.00	56.50	83.25
Oct. 10	24.50	14.00	13.50	121.50	20.00	39.00	56.50	83.25
Sept. 25-30	24.50	13.80	13.50-14.00	121.50	20.00	39.00	56.50	83.25
Sept. 22-24	24.50	13.80	13.50	121.50	20.00	39.00	56.50	83.25
Sept. 18-20	24.50	13.80	14.00	121.50	20.00	39.00	56.50	82.25
Sept. 12-17	24.50	13.80	14.50	121.50	20.00	39.00	56.50	83.25
Sept. Avg.	24.50	13.80	13.99	121.50	20.00	39.00	56.50	83.25
Aug. Avg.	24.50	13.80	14.067	121.50	19.923	39.00	56.50	83.25
July Avg.	24.50	15.80	15.00	121.50	19.00	39.00	56.50	82.885
June Avg.	24.50	15.06	15.74	121.50	19.00	39.00	56.50	82.75
May Avg.	24.50	15.519	19.50	121.50	19.00	42.077	56.50	85.356
Oct. 1951 Avg.	24.50	18.726	19.426	163.00	19.00	42.00	56.50	88.12
Oct. 1947 Avg.	21.50	14.525	10.50	80.00	15.00	33.00	35.00	71.375

Note: Copper, electrolytic, del. Conn. Valley. Lead, common grade, del. St. Louis. Zinc, price western, F. St. Louis. Tin, Straits, del. New York. Aluminum, primary ingots, 99%, del. Antimony, bulk, f.o.b. Laredo, Tex. Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound except silver, cents per ounce.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb, f.o.b. shipping point, freight allowed: Flat, rolled, 38.34c; oval, 37.84c.

Nickel Anodes: Rolled oval, carbonized, carloads, 74.50c; 10,000 to 30,000 lb 75.50c; 3000 to 10,000 lb 76.50c; 500 to 3000 lb 77.50c; 100 to 500 lb, 79.50c; under 100 lb, 82.50c; f.o.b. Cleveland.

Nickel Chloride: 36.50c in 100 lb bags; 34.50c in lots of 300 lb through 10,000 lb; 34.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on 300 lb or more.

Sodium Stannate: 25 lb cans only, less than 100 lb to consumers 86.7c; 100 or 350 lb drums only, 100 to 600 lb 71.60c; 700 to 1900 lb, 69c; 2000 to 9900 lb, 67.3c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Tin Anodes: Bar, 1000 lb and over, $1.42; 500 to 999 lb, $1.425; 200 to 499 lb, $1.43; less than 200 lb, $1.445. Freight allowed east of Mississippi and north of Ohio and Potomac.

Zinc Cyanide: 100 lb drums, less than 10 drums 54.30c, 10 or more drums, 52.30c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.11; more than 2000 lb, $1.09. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Chloride (Anhydrous): In 400 lb bbl, 98.5c; 100 lb kegs 99.5c. Freight allowed.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.375
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	10.75
Phos. Bronze, 5%	25.25	25.00	24.00

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group 1: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass, 17.00 per lb of dry Cu content for 40 to 60 per cent material and 17.25 per lb for over 60 per cent material.

Group 11: No. 1 soft red brass solids 18.50; No. 1 composition borings 19.25 per lb of Cu content plus 63 cents per lb of tin content; mixed brass borings 18.25 per pound of Cu content plus 60 cents per lb of tin content; unlined red car boxes 18.25; lined red car boxes 17.25; cocks and faucets 16.00; mixed brass screens 16.00; zincy bronze solids and borings 16.25.

Aluminum Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50; high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50. Mixed plant scrap: Copper-free solids, 10.00; dural type, 9.00. Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Lead: Heavy 11.75-12.00; battery plates 6.50-7.00; linotype and stereotype 13.50-14.00; electrotype 11.75-12.00; mixed babbitt 14.50-14.75.

Zinc: Old zinc, 6.00-6.50; new die cast scrap, 6.00-6.50; old die cast scrap, 4.75-5.00.

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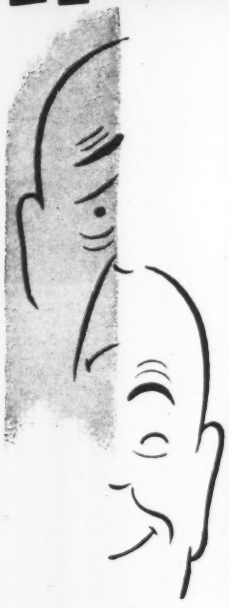

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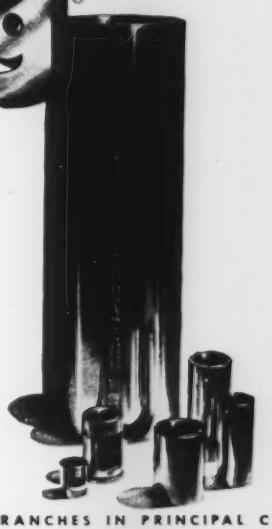

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Sheets, Strip . . .

Sheet and Strip Prices, Page 347 & 348

Boston—Forward pressure for narrow cold-rolled strip is light. Consumers, realizing strip supply and delivery have improved, see no need for forward buying. Nonintegrated mills are building inventories of hot strip slowly and there are some fourth quarter openings.

New York — Demand for nickel chromium for jet engine and atomic energy requirements is expanding, but it is shrinking in other directions, including radar, with the result there is a slight easing in supply.

Philadelphia—Sheet inquiry is brisk from district manufacturers of appliances and related items. Automotive requirements are well maintained.

Pittsburgh—Supply of sheets and strip is catching up with demand but there is little chance of obtaining any new tonnage in fourth quarter.

Cleveland—Sheet sellers here say it will be second quarter next year before supply conditions ease to the point civilian goods manufacturers' needs can be promptly filled.

Chicago — Conversion ingots are coming in well. The leading converter here has its available rolling space sold out through first quarter and is turning down business.

Steel Bars . . .

Bar Prices, Page 347

Chicago—Farm equipment production in 1953 may be off from 20 to 40 per cent but this isn't reflected in bar demand. Manufacturers are pressing for steel because of unbalanced inventories.

Boston—Demand for carbon and alloy bars holds high with openings for first quarter narrowing. Few mills will have more than part of one month, March, for new volume.

Philadelphia — Consumers of hot-rolled carbon bars for non-defense use will be lucky if they can get new tonnage on mill books by March.

Pittsburgh—Orders are being taken on bars for February and March. Military demand continues heavy.

Cleveland—The heavy tonnage carryover from fourth quarter will determine the extent of new bookings in first quarter. Actually, producers think there will be little open tonnage for the period, anticipating a substantial overflow into second quarter.

Plates . . .

Plate Prices, Page 347

Cleveland — Not much change in tight plate supply conditions is anticipated before second quarter next year. Shortage is especially acute in heavy gages and is not likely to improve much over coming months. Indicative of tight supply in this market, the Navy is reported combing warehouses throughout the country for needed tonnage.

New York—District plate consumers for the most part are receiving tonnage promised before the steel strike. They are not getting as much as they would like, however, and in some cases it is causing a definite restriction in their operations.

Philadelphia — District plate production is expanding as the two mills

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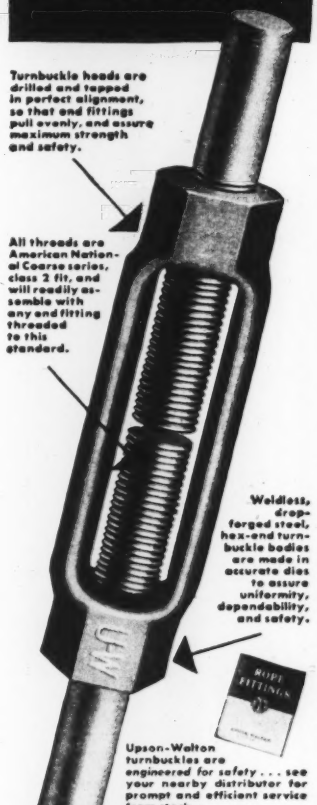
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of the Claymont, Del., producer again get underway.

Birmingham—Plate supply in this district continues short. Major requirements are being met but there is a market for considerably larger tonnage than district mills can produce.

Seattle—Plates are in critical supply. Small fabricating shops have had to curtail operations in some instances for lack of steel.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 347

Boston—With the placing of approximately 2000 tons, bulk of pending concrete steel bar tonnage here has been purchased and inquiry is slower. On 1315 tons, Fore river bridge, Portland, Me., successful contractors bid 7.286c per pound delivered, and 2.86c for placing.

Tubular Goods . . .

Tubular Goods Prices, Page 351

Los Angeles—Consolidated Western Steel Division, U. S. Steel Co., has completed agreements with Ebasco Services Inc., New York, agent for West Coast Pipe Line Co., to supply about 40 per cent of the 210,000 tons of steel pipe required for the proposed 960-mile crude oil pipeline from Wink, Tex., to Norwalk, Calif. Pipe deliveries will start in January.

Seattle—No large tonnages of cast iron pipe are up for early bidding. Pacific States Cast Iron Pipe Co.'s Provo plant is operating at capacity.

Structural Shapes . . .

Structural Shape Prices, Page 347

Cleveland—Shortage of structurals extending into next year is believed holding back considerable work. Much public construction is in prospect but there is not much in the way of new commercial tonnage looming. A bridge over the Ohio river at Lawrenceburg, Ind., will require 2100 tons of carbon structurals, 1700 tons of low alloy structurals, 38,700 feet of piling, and an unstated tonnage of reinforcing steel. Bids will be taken Nov. 12 at Indianapolis by the Indiana State Toll Bridge Commission. Recent awards include an undisclosed tonnage of fabricated structural steel for a steam plant building in the Portsmouth, O., area placed by Peter Kiewit Sons' Co., contractors, with the Roanoke Bridge & Iron Works. This job went at $214.45 per ton plus $4.14 freight per ton.

Boston—Practically all first quarter structural rollings will be against fourth quarter allotments.

Philadelphia—Inquiry is slowest in three years. Even bridge work is off.

Seattle—Some structural fabricators find it difficult to bid because of the scarcity of certain items, especially wide flange sections. Eastern producers are behind on deliveries.

Rails, Cars . . .

Track Material Prices, Page 349

Philadelphia—Pensylvania railroad placed 75,000 net tons of steel rail with U. S. Steel Co., Bethlehem Steel Co., and Inland Steel Co. Deliveries begin in January.

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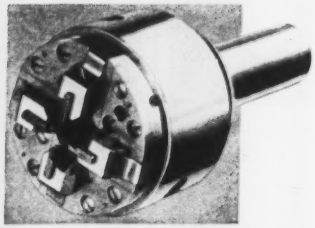

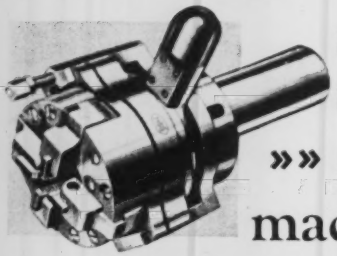

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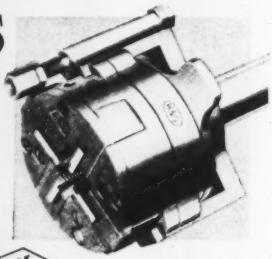

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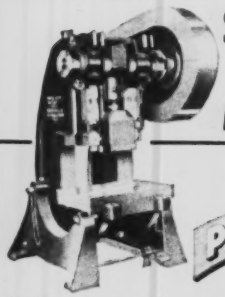

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Pig Iron . . .

Pig Iron Prices, Page 346

New York—Shipments of pig iron and other raw materials are being held up at eight gray iron foundries in the Newark area closed by an AFL union walkout over wage differentials.

Philadelphia—Demand for basic pig iron exceeds supply, but that for foundry iron is in fair balance. Gray iron foundry business is a little better, but it is still far from good.

Pittsburgh — Foundry activity is picking up. Pig iron supply is sufficient to take care of this upswing.

Cleveland—Merchant iron is moving steadily to foundries but pressure on sellers is not excessive.

Scrap . . .

Scrap Prices, Page 354

Buffalo—Extension of a shipment embargo by one district mill last week featured the scrap market. Firmer tendencies prevail with limited sales of steelmaking grades noted. Slightly stronger under-current is reported in cast grades though these still are quoted $2 to $3 below ceilings.

Boston—Cast scrap is easy with cupola cast $8 below ceiling and breakable $5 under. Buying is slow. Steel scrap is at ceiling for all grades with shipments steady.

New York—Scrap brokers' prices are unchanged with demand generally active. Greater steadiness prevails in steel than in cast grades.

Philadelphia — Open-hearth scrap stocks are comfortable but demand is keeping prices at ceiling. Shipments are moving to the Fairless Works, Morrisville, Pa. It is expected 100,000 tons will be piled by the time open-hearth production begins in late February or early March.

Pittsburgh—While scrap prices are at ceiling levels there is little activity. Mills hold good supplies. Only one mill in the area is buying, and then only top quality material.

Cleveland — Steady movement of steelmaking grades to the mills serves to support the market at government ceiling levels. Cast grades are sluggish and show signs of price softness. Cleveland Transit System scrap is going to dealers on bids above government established ceilings for railroad scrap. Scrap rails went on a bid of $48.75 against the railroad ceiling of $46.24, while miscellaneous material went at $42.75 compared with the railroad ceiling of $36.24.

Detroit — Shipment of industrial scrap from this area to Pittsburgh and Valley mills has done much to sustain the local market. No such support is present for cast scrap.

St. Louis—Cast scrap is piling up in dealers' yards with no takers. Most small foundries are operating only 1-shift, 2-to-4-days a week. Current quotations are below ceilings. Unstripped motor blocks are available at $38 delivered, and No. 1 cupola cast can be had at $48 delivered.

Birmingham — Demand for open-hearth scrap is moderate. Some large purchases were made recently by the district's major consumer.

Los Angeles—Cast scrap is firming as the foundry melting rate increases. Steelmaking scrap is being shipped in from Arizona.

San Francisco—No. 1 cupola cast has weakened further and now is quoted at $43 per ton, off $2 from the level recently prevailing in the open market.

Seattle—Steel scrap is arriving in steady volume and mills in this area are in position to improve inventories.

Warehouse . . .

Warehouse Prices, Page 353

Boston — The regulation requiring warehouses to hold 56 per cent of incoming tonnage of various products for 15 days to meet defense orders is considered unrealistic. With most distributors, rebuilding of inventories to pre-strke level is slow.

Philadelphia — Warehouse business is sustained at the September level. Mill shipments are uniformly better.

Chicago—Continued stiff customer demand precludes warehouses rebuilding their low inventories. Receipts from mills are substantial but material moves out as fast as received.

San Francisco—Warehouse steel inventories are estimated to be around 30,000 tons in the Bay area. Many items are critically short.

Seattle—September order volume was disappointing for some warehouses but October has opened with increased demand in evidence.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 351

Philadelphia—Higher prices are expected shortly on coke. Most sellers are billing with a clause to the effect increases may be made retroactive to early October.

Canada . . .

Toronto, Ont.—Production of primary iron and steel shapes in Canada during June was 410,335 net tons, comparing with 434,160 tons in May and 263,789 tons in June, 1951.

In June, 59,791 tons went direct to railways and railway car shops; 9056 to pressing, forming and stamping plants; 32,316 to merchant trade products; 25,850 to building construction; 21,852 to the containers industry; 12,791 to agricultural equipment; 17,574 to the automotive industry; 14,610 to machinery plants; 4510 to shipbuilding; 20,450 to mining, lumbering, etc., and 8600 to miscellaneous industries. Warehousing accounted for 28,206 tons and exports for 8079 tons.

Toronto, Ont.—Steel prices have moved upward $2.50 to $4.50 per ton. Bars and plates are $3.50 per ton higher, with a like jump in cold-rolled sheets. Hot-rolled sheets are up $2.50.

Not all product prices are increased. Galvanized sheets, nails and wire are unchanged.

Steps now are being taken for a revision of extras.

Demand for steel continues brisk

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PENDING

1500 tons, state bridge, Brunswick, Md., bids expected shortly.

1400 tons, Washington state Snohomish river bridge; bids to Olympia, Nov. 6.

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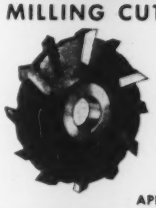

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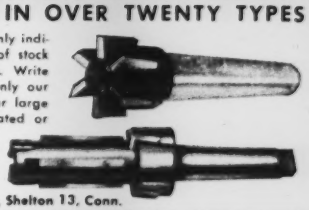

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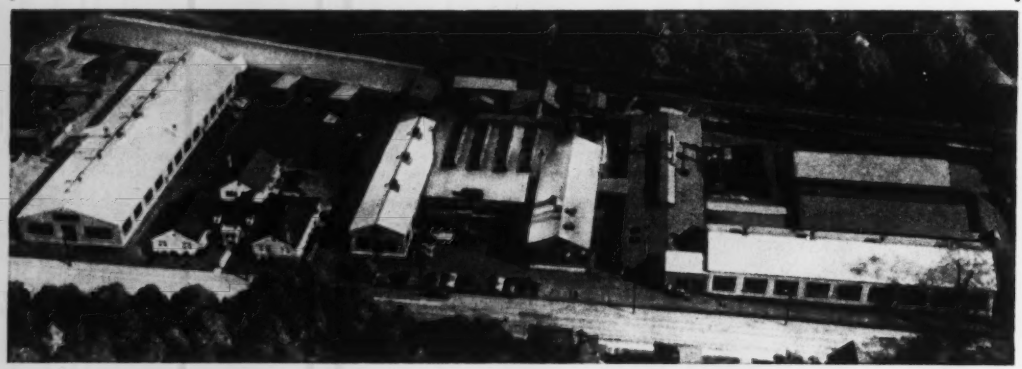

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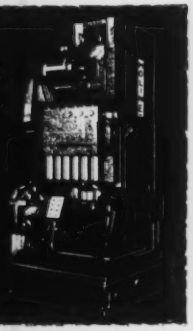

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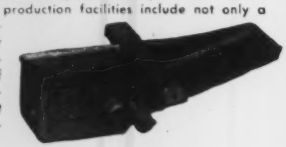

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400 tons, plant addition, DuPont interests, Seaford, Del.; bids asked.

350 tons, Penn National Bank Bldg., Philadelphia; bids asked.

250 tons, also 50 tons reinforcing, Washington state Trinidad undercrossing; first bids rejected; rebid call at Olympia, Oct. 21.

200 tons, hangar, warehouse, shops, Whidby Island, Washington state, Navy base; Strand & Sons, Seattle, low $3,355,000.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1315 tons, highway and railroad bridge, Fore river, Portland-South Portland, Me., to Bancroft & Martin Rolling Mills Co., Portland; W. H. Hinman Inc., North Anson, Me., and Ellis Snodgrass, Portland, joint general contractors.

2000 tons steel H-piling also to Bancroft & Martin.

1200 tons, Battery street (Seattle) tunnel, state highway viaduct, to Bethlehem Pacific Coast Steel Corp., Seattle; Morrison, Knudsen Co., Seattle, general contract.

1000 tons, Ladd field, Alaska, powerhouse extension, to Northwest Steel Rolling Mills Inc., Seattle; Lytle Green & Birch joint low bidders, general contract.

REINFORCING BARS PENDING

1200 tons, Tacoma city light department administration building, Dahlgren Construction Co., Seattle, low $11,128,380.

750 tons, Washington Snohomish river bridge; bids to Olympia, Nov. 6.

440 tons, state bridge work, Warren county, New Jersey; bids Oct. 28.

170 tons, state bridge work, Palisades Interstate Parkway, Bergen county, New Jersey; bids Oct. 28.

130 tons, Washington state highway projects; bids to Olympia, Oct. 21.

PLATES . . .

PLATES PLACED

1000 tons H-piling, Battery street state vehicular tunnel, Seattle; materials furnished by Washington state.

PLATES PENDING

270 tons, naval supply depot, procurement branch, Great Lakes, Ill.; bids Oct. 15.

PIPE . . .

CAST IRON PIPE PLACED

300 tons, for Marysville, Wash., to Pacific States Cast Iron Pipe Co., Provo, Utah.

182 tons, King county, Wash., district No. 61, to Pacific States Cast Iron Pipe Co., Provo, Utah.

160 tons, system expansion, Port Angeles, Wash., to Pacific States Cast Iron Pipe Co., Provo, Utah.

CAST IRON PIPE PENDING

200 tons, 14,100 feet 24- to 6-inch water mains and fittings, also alternatives; bids to District No. 68, Bellevue, Wash., Oct. 13.

185 tons, 6- and 4-inch mains, 17,000 linear feet, King county District No. 75; alternatives for steel pipe; bids Oct. 11.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Delaware, Lackawanna & Western, six 1600-hp diesel locomotives, to Fairbanks, Morse & Co., Chicago.

RAILROAD CARS PLACED

Estrada de Ferro Sorocabano, Sao Paulo, Brazil, to Mt. Vernon, Ill., plant of Pressed Steel Car Co. Inc. List comprised of 1000 forty-ton box cars, 300 stock cars and 200 high-side gondolas.

Missouri Pacific, 500 fifty-ton box cars, to own shops; for operation on its subsidiaries.

Paulista Railroad Co., Sao Paulo, Brazil, 430 fifty-ton box cars to Mt. Vernon, Ill., plant of Pressed Steel Car Co.

RAILROAD CARS PENDING

Northern Pacific, 24 passenger cars, including 10 dome coaches, six dome sleeping cars, two dining cars, four sleeping cars and two coaches; award expected shortly.

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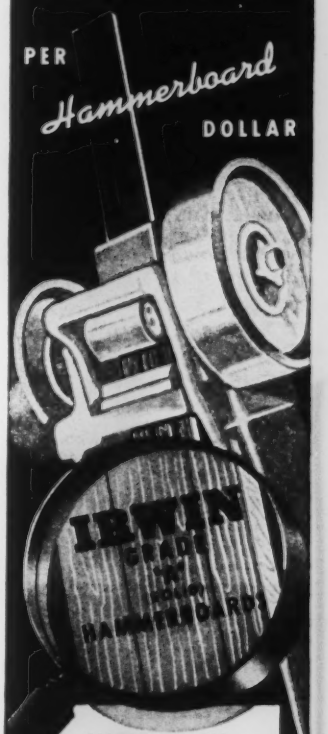

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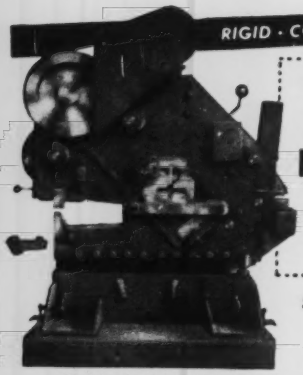

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Shears Angles (Square Cut)	3½" x 5/16"	4" x ⅜"	5" x ½"
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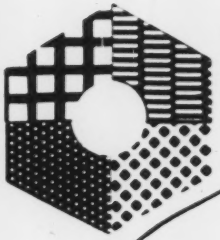

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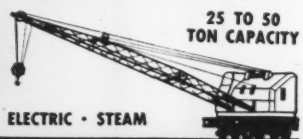

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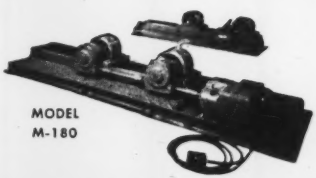

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CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Carpenter Steel Expanding Mill

Mill expansion to make possible an increase in production capacity by about 40 per cent is under way at Carpenter Steel Co.'s Alloy Tube Division in Union, N. J. An addition is being built to meet the rising demand for stainless steel pipe and tubing. This expansion will be achieved without a commensurate increase in the use of nickel and other strategic alloys because of the plant's emphasis on extra light wall pipe known as Schedule 5. The addition is to be completed and in operation by the third quarter in 1953.

Canadian Firm Gets Aircraft Order

Canadian Car & Foundry Co., Montreal, Que., received an order for aircraft from the United States government totaling $33,603,920. The aircraft will be built in the company's Fort William plant.

Windalume Occupies Kenvil Plant

Windalume Corp., manufacturer of aluminum windows, is occupying its new plant in Kenvil, N. J.

Visi-Trol Triples Plant Capacity

Visi-Trol Corp. moved its expanded production facilities into a new and larger building at 9345 Hubbell, Detroit. Completion of its expansion program has tripled the firm's manufacturing facilities for visual production control equipment, quality control chart holders and wood-and-metal fabrications.

New Process for Melting Borings

Meehanite Metal Corp., New Rochelle, N. Y., concluded an agreement with Crofts Engineers Ltd. for exclusive right to enter into agreement with industries in the United States, Canada, Mexico, Central America and South America for use of a new process for melting metal borings. The unique features of this process, Meehanite says, consist of feeding turnings, borings, etc. into a chute placed at cupola platform level and forcibly assisting their introduction through the refractory wall of the cupola just above the melting zone.

Skilsaw Changes Name to Skil Corp.

Skilsaw Inc., Chicago, manufacturer of portable electric and pneumatic tools, changed its name to Skil Corp. The firm's product line has been expanded from one portable electric saw when the firm was founded to over 150 different Skil tools, including drills, sanders, grinders, drivers and polishers.

ChemoTec To Exploit Bonding Process

ChemoTec Division, Eutectic Welding Alloys Corp., New York, signed an exclusive agreement with Ciba Co. Inc., New York, to exploit the processes developed from an important line of new materials that perform unique functions in bonding metals.

National Lead Acquires Valve Firm

National Lead Co., New York, organized Pioneer Alloy Products Division to take over Pioneer Alloy Products Co. Inc., Cleveland. Manufacturing operations of the division will be located in Ellwood City, Pa., in a National Lead plant equipped as a foundry and machine shop which has been idle for some time. The division's production will consist of

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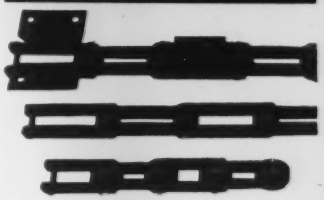

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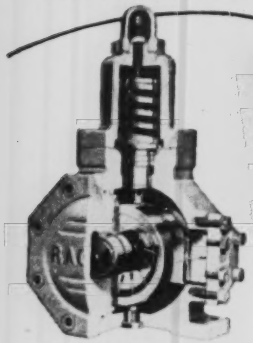

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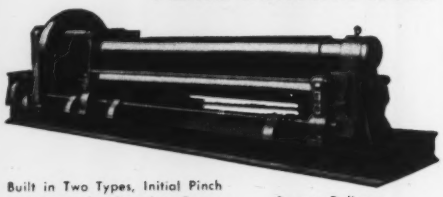

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corrosion-resisting valves for the chemical processing and refining industries; heat-resisting and acid-resisting castings for general industrial use; chrome-nickel-steel valves now manufactured at National Lead's Fitchburg, Mass. plant.

Nonferrous Fastener Maker Expands

H. M. Harper Co., Morton Grove, Ill., manufacturer of nonferrous bolts and nuts, is constructing another addition to its plant. It will house the firm's newly developed Aero Division, specializing in the manufacture of high-temperature fastenings used in the jet engine industry.

Tank Firm Buys Iron Works

Pressed Steel Tank Co., Milwaukee, acquired all the outstanding capital stock of Downingtown Iron Works, Downingtown, Pa. Downingtown Iron will retain its present corporate structure and be operated as a division of Pressed Steel Tank Co. The latter manufactures gas cylinders, air receivers, fuel tanks and other pressure vessels. Downingtown Iron fabricates stills, heat transfer equipment, converters, evaporator columns, storage tanks and large-sized pressure vessels.

Parker Appliance Names Distributor

Korhumel Steel & Aluminum Co., Indianapolis, was appointed distributor of industrial tube fittings, tube tools, and O-rings manufactured by Parker Appliance Co., Cleveland.

Blaw-Knox To Install Equipment

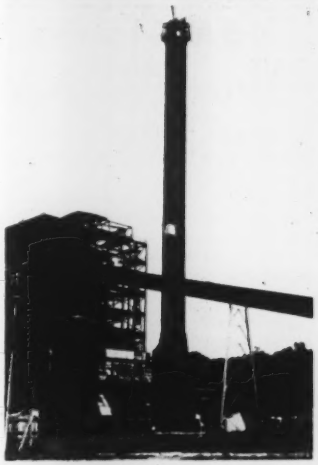
Chemical Plants Division, Blaw-Knox Construction Co., Pittsburgh, received a contract from Honeymead Products Co. to furnish and install all necessary equipment for processing 500 tons of soybeans per day at the latter's Mankato, Minn., location.

Electrolizing Co. Reorganized

Electrolizing Co., an individual proprietorship owned by David B. Grant, became the Electrolizing Co., a California corporation, engaged in processing and manufacturing; and Electrolizing Sales & Tools Inc., a California corporation, engaged in selling. Its plant is located at 1406 E. 15th St., Los Angeles. Plans are being made for additional plants for servicing the Portland, Oreg., San Francisco, Seattle, and Texas industrial areas.

Machinery Firms Incorporated

Charters of incorporation to engage in the machinery business were filed with the secretary of state's office, Dover, Del., by American Vegra Corp. and Southern Sola Catalytic Co., listing Corporation Trust Co., Wilmington, Del., as their principal offices; Electralab Inc. and J. A. Fischer Corp., listing U. S. Corporation Co., Dover, as their principal offices.



Steel Stack Soars Skyward

Soaring 250 feet above the Meramec power station of the Union Electric Co., St. Louis, is this steel stack constructed by Nooter Corp. of that city. The 250-foot structure is the first of two all-welded steel stacks to be erected by Nooter. Welders work from cages suspended on rollers. Inside welding requires installation of a platform within the stack, lowered by four chain hoists

Nash-Kelvinator Buys Equipment Firm

Nash-Kelvinator Corp., Detroit, purchased controlling interest in Altorfer Bros. Co., Peoria, Ill., maker of ABC laundry equipment. Nash-Kelvinator intends to operate Altorfer as a subsidiary under its present management.

Erie Iron Buys Hoist & Pulley Firm

Erie Iron & Supply Co. purchased the Erie Hoist & Pulley Co., both of Erie, Pa. The latter concern was operated until the recent death of Henry Hagenlocher. It was engaged in the manufacture of hoists, pulleys and in general machine shop work.

Industrial Bench Expands Line

Industrial Bench & Equipment Mfg. Co., formerly a division of Brunnette Tool Co. Inc., New Britain, Conn., acquired all the tools, dies, drawings and machinery of the New Britain Machine Co., Shop Furniture Division, New Britain, Conn. A new plant is in operation at 89 South St., that city.

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13/16"	"	"	978 lbs.	3-1/4"	"	"	620 lbs.
15/16"	"	"	23 lbs.	**TYPE 309**			
7/8"	"	"	25 lbs.	5/16"	Diameter	Weight	600 lbs.
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1-1/8"	"	"	944 lbs.	1"	Diameter	Weight	10,000 lbs.
1-3/16"	"	"	210 lbs.	**TYPE 347**			
1-5/16"	"	"	4,403 lbs.	3/4"	Diameter	Weight	1,002 lbs.
1-3/8"	"	"	2,984 lbs.	1-3/16"	"	"	200 lbs.
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¾ x 2⅝"—30 Kegs	¾ x 3⅛"—2 Kegs
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330 pcs. - 15" Channels @ 33.9# - 6'4"

PLATE GIRDERS:

QUAN.	LBS WT. EA.	LENGTH	DEPTH B TO B FLANGES	WEB THICKNESS	FLANGE ANGLES	SECTION MODULUS (in 3)
2	9,981	35'0½"	86½"	7/16"	4-6x6x3/8"	1,180
2	9,315	34'6 3/4"	75½"	3/8"	4-6x6x7/16"	1,050
2	9,240	34'11"	75½"	3/8"	4-6x6x7/16"	1,050
6	9,205	34'11"	75½"	3/8"	4-6x6x7/16"	1,050
4	9,206	34'11"	75½"	3/8"	4-6x6x7/16"	1,050
2	9,243	34'11"	75½"	3/8"	4-6x6x7/16"	1,050
2	9,957	34'7-1/2"	86½"	7/16"	4-6x6x3/8"	1,180
20	9,946	34'7-1/2"	86½"	7/16"	4-6x6x3/8"	1,180
2	10,288	35'11-3/4"	86½"	7/16"	4-6x6x3/8"	1,180
1	6,443	Ap. 25'	41½"	3/8"	4-6x6x1/2"	510
1	7,504	26'4-1/2"	75½"	3/8"	4-6x6x7/16"	1,050
1	6,783	Ap. 25'	75½"	3/8"	4-6x6x7/16"	1,050
1	7,372	Ap. 25'	75½"	3/8"	4-6x6x7/16"	1,050

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Service that saves...
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Glistening Aluminum Foil Transforms Air Ducts

Like stalactites in an underground cavern, these aluminum-foil covered structures seem to glisten in the dark. Beneath the aluminum wrappings are air ducts, insulated with spun glass, part of the air conditioning system at Proctor & Gamble Co.'s new Miami valley research laboratories in Ohio. In the labs, scientists conduct studies in the field of soaps, detergents, shortenings and toiletries

Western Electric To Build in South

Western Electric Co. Inc., New York, awarded a contract to Walter Kidde Constructors Inc., that city, for the engineering design of a 350,000 sq ft building to be located at Winston-Salem, N. C.

General Controls Opens Skokie Plant

General Controls Co., Los Angeles, producer of automatic controls for home and industry, opened a manufacturing plant in Skokie, Ill.

Steel Container Firm Organized

Vulcan Steel Container Co. was organized by Gordon D. Zuck for the manufacture of steel pails. A plant was established in Birmingham.

Pipe Firm Opens Seattle Office

Pacific States Cast Iron Pipe Co., Provo, Utah, opened a branch sales office in Seattle. William Thoresen is in charge.

Wagner Boosts Plant Capacity

Wagner Electric Corp., St. Louis, increased its tranformer manufacturing capacity by purchasing a portion of Fulton Iron Works Co.'s property. Wagner acquired four buildings having a combined floor area of more than 100,000 sq ft. Manufacture of large distribution, small power and all unit substation transformers will be concentrated in the new section. Production of large power transformers will be centralized in the main transformer shop, which will be equipped with heavier cranes, new high-voltage testing apparatus, additional annealing furnaces and otherwise converted to make possible the manufacture of transformers weighing up to twice as much as the largest units that can be built with present facilities. The expansion and conversion program will require at least one year to complete and will cost in excess of $1 million.

Allen Bradley To Build in Canada

Allen Bradley Co., Milwaukee, acquired a building site in Galt, Ont., on which it will erect a plant to manufacture electrical controls, etc.

Claude Schneible Moves Offices

Claude B. Schneible Co. moved its executive offices to 212 Stephenson Bldg., P.O. Box 81, North End Station, Detroit 2.

Babcock & Wilcox Expands in South

Babcock & Wilcox Co., New York, purchased facilities of a former shipyard from Brunswick Port Authority, Brunswick, Ga., and will convert it into a plant to build boilers and related equipment. The property involved consists of about 110 acres with about 250,000 sq ft under roof and was formerly the J. A. Jones shipyard. Rehabilitation work, together with installing necessary equipment, will start immediately and is scheduled to be completed about the first of next year.

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Available

for the first time...

a Full-Color Sound Film

STEEL WITH A THOUSAND QUALITIES

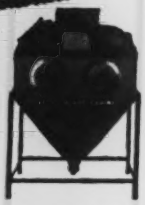
Scientific schools and groups of designers, engineers, metallurgists and technical societies can *now* secure the *free* use of this full-color sound film, the first produced in the steel foundry industry. Available in 16 mm prints, the film is a 37-minute tour of the modern plant of Lebanon Steel Foundry. The camera follows jobs from the blueprints on the project engineer's desk through steps of production to show, finally, a few of the many important uses of Lebanon quality Steel Castings. Write for information on this exciting and educational film.

LEBANON STEEL FOUNDRY
Dept. B, Lebanon, Pa.
In the Lebanon Valley

LEBANON
ALLOY AND STEEL
castings

Here's BIG NEWS on Blast Cleaning Dust Control Precision Finishing

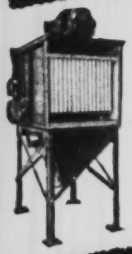
BLAST CLEANING!



Blast Cleaning Cabinet cleans rust, grime, dirt, paint, etc., from metal parts. Produces a smooth surface on pieces up to 60" x 36". Models from $319.00 and up.

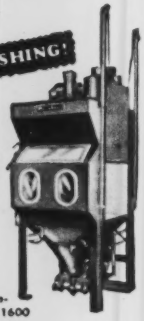
Blast Cleaning Machine removes rust, dirt, scale, etc., is ideal for maintenance work. Cleans large objects such as bridges, tanks, etc., before painting. Six sizes, portable or stationary from $170.00 and up.

DUST COLLECTING!



Unit Dust Collector stops dust at source, minimizes machine wear and tear, reduces housekeeping and maintenance costs. Solves many grinding and polishing nuisances. Models from $286.00 and up.

PRECISION FINISHING!



Hydro-Finish Cabinet uses liquid blast to polish, clean and finish molds, dies, etc. Removes scale, discoloration with minimum hand work. Holds tolerances to .0001". Models from $1410.00 and up.

Write for details on these machines to: Pangborn Corp., 1600 Pangborn Blvd., Hagerstown, Md.

Pangborn

Look to Pangborn for the latest developments in Blast Cleaning and Dust Control Equipment

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WILSON

RADIANT CONVECTOR FURNACES

FOR COILED STRIP ANNEALING

ENGINEERED AND CONSTRUCTED by

Lee Wilson ENGINEERING Co., Inc.

THE above installation of Wilson radiant convector furnaces in the plant of the Wallace Barnes Company of Bristol, Connecticut, is used exclusively for high carbon steel coil annealing.

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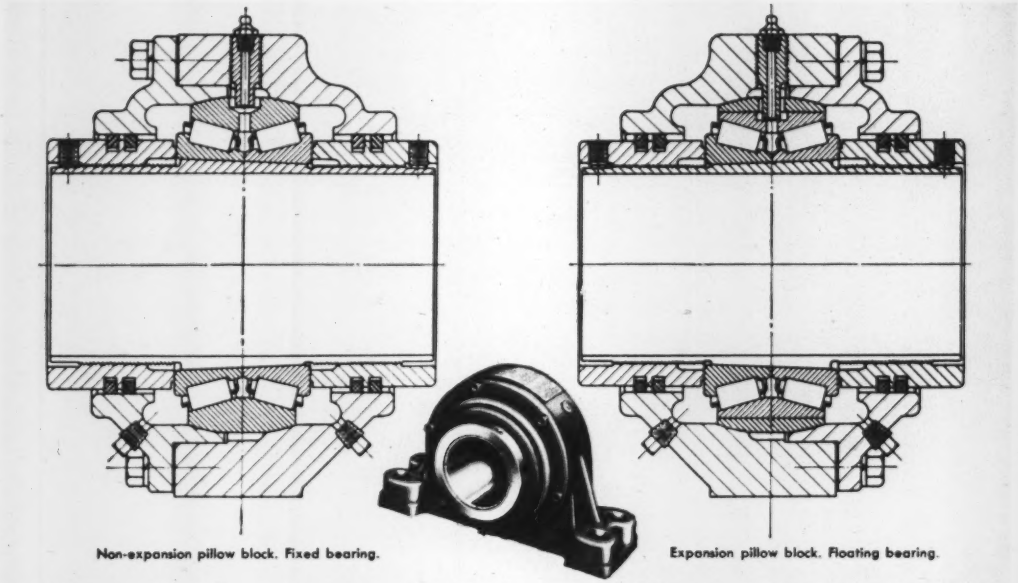
INDUSTRIAL FURNACES ★ RADIANT TUBE HEATING ★ HEAT TREATING PROCESSES

NEW TIMKEN® BEARING PILLOW BLOCK



Non-expansion pillow block. Fixed bearing.

Expansion pillow block. Floating bearing.

First application of new tapered bore TIMKEN® bearing makes new Dodge-Timken pillow block more compact

IT takes up less space. It weighs less. Yet the new Dodge-Timken® All-Steel pillow block has tremendous load-carrying capacity.

It's the result of the combined achievements of the Dodge Manufacturing Corporation, Mishawaka, Indiana, and The Timken Roller Bearing Company and makes use of an entirely new Timken bearing. Never before has a self-aligning, non-adjustable tapered roller bearing with tapered bore been used in pillow blocks.

Being of all-steel construction, this new Dodge-Timken pillow block is more compact and fills a real need where space is a factor. It is available in both expansion and non-expansion designs. And it incorporates all the advantages of Timken tapered roller bearings.

Because of their tapered construction, Timken bearings take radial and thrust loads in any combination. Line contact between rollers and races gives Timken bearings load-carrying capacity to spare. Timken bearings are made of the finest steel ever developed for tapered roller bearings—Timken fine alloy steel—and under normal conditions will last the life of the machinery with which the pillow blocks are used.

When you install new Dodge-Timken pillow blocks, you can expect dependable performance because the bearings are the best. No other bearing can give you all the advantages you get with Timken bearings. Specify them for all your other machinery, too. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means: its bearings are the best.

TIMKEN

TAPERED ROLLER BEARINGS

NOT JUST A BALL · NOT JUST A ROLLER · THE TIMKEN TAPERED ROLLER · BEARING TAKES RADIAL · AND THRUST · LOADS OR ANY COMBINATION